Software Guide To Word Processing

The Home User's Guide to Commodore Computing

RUN

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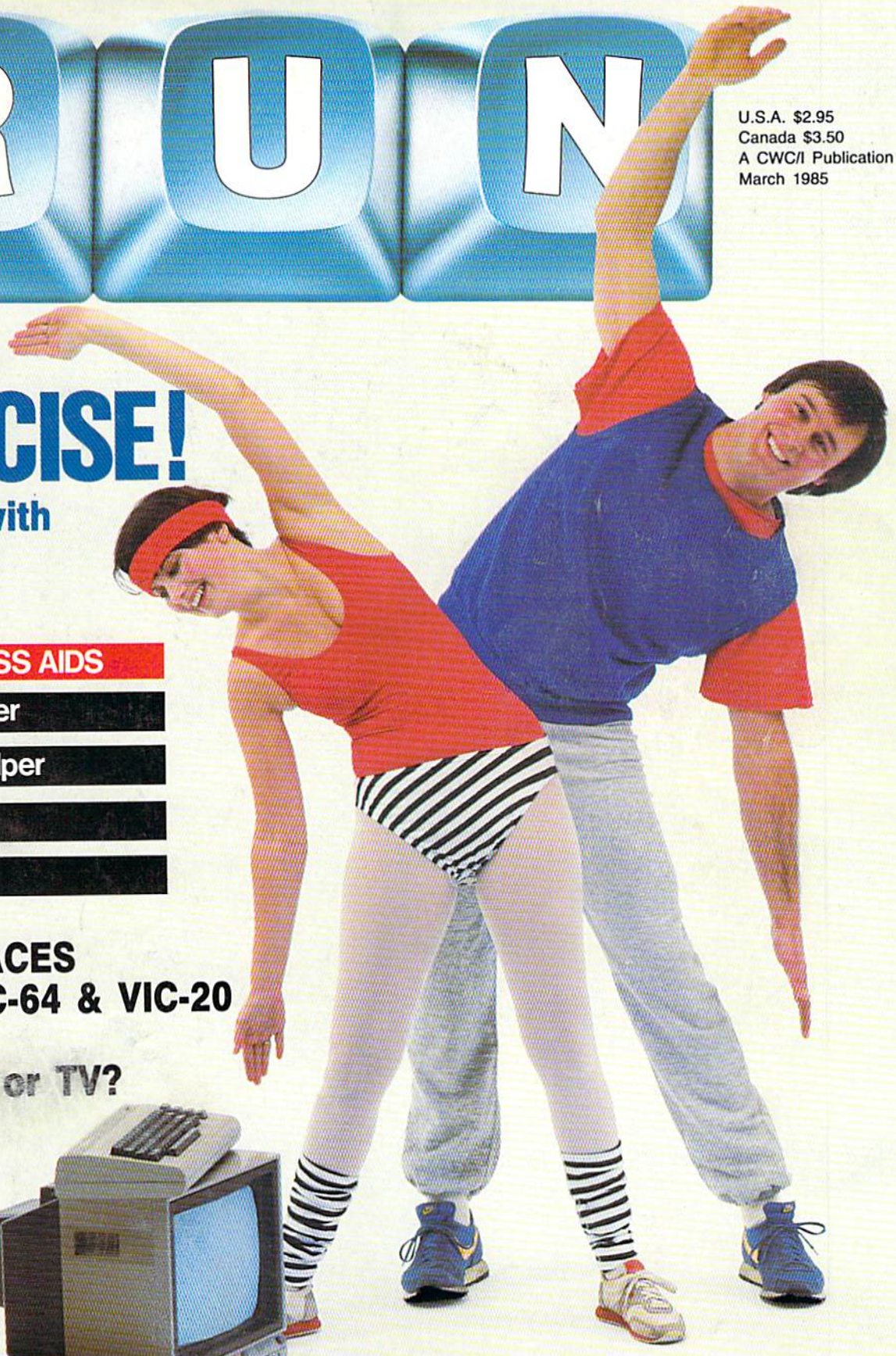
A CWC/I Publication
March 1985



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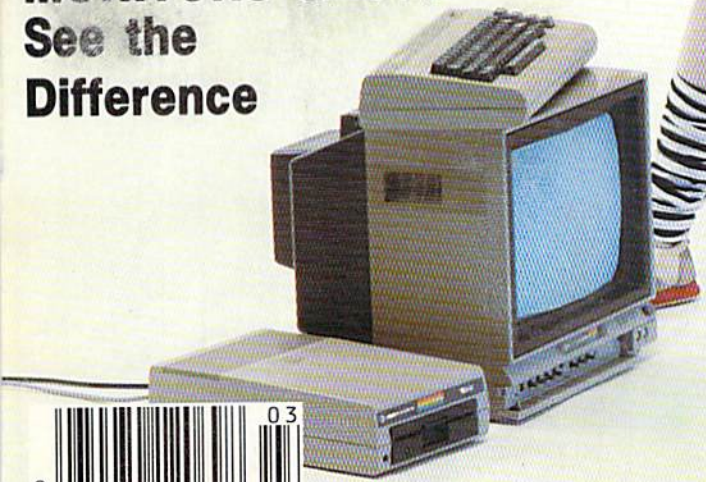

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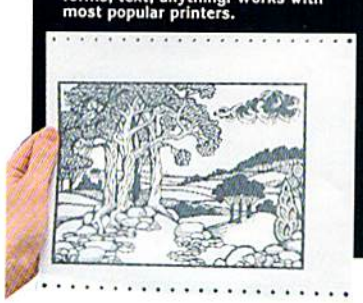

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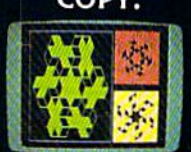

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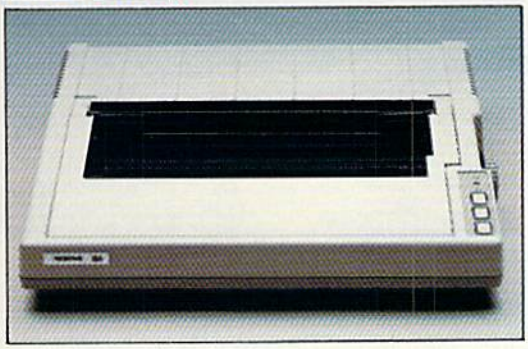
FEATURES	RITEMAN C+	ACTUAL PRINT	COMMODORE PRINTERS				
			MPS 801	MPS 802	MPS 803	VIC1525	VIC1526
PRINT SPEED (CPS)	105		50	60	60	50	60
BIDIRECTIONAL PRINT	YES		NO	YES	YES	NO	YES
(COLUMN WIDTH)							
40 CHARACTERS PER LINE	YES	40 CPL	YES	YES	YES	YES	YES
80 CHARACTERS PER LINE	YES	80 CPL	YES	YES	YES	YES	YES
66 CHARACTERS PER LINE	YES	66 CPL					
132 CHARACTERS PER LINE	YES	132 CPL					
(PAPER HANDLING)							
FRONT LOADING FOR EASY PAPER SETTINGS	YES						
BUILT-IN PRINTER STAND	YES						
PRINT ON POST CARDS	YES						
(WARRANTY)							
ONE-YEAR WARRANTY	YES						
(SOFTWARE COMMANDS)							
DOUBLE STRIKE	YES	DOUBLE STRIKE					
EMPHASIZED	YES	EMPHASIZED					
COMPRESSED	YES	COMPRESSED					
UNDERLINE	YES	UNDERLINE					
SUPER/SUBSCRIPTS	YES	SUPER SUB SCRIPTS					
ITALICS	YES	ITALICS					
DOUBLE DENSITY BIT IMAGE	YES	C:\					
(CHARACTERS)							
9X9 FONT	YES						
TRUE DISCENDERS	YES	abcgjpqyabc					
ITALICS	YES	ITALICS					
COMMODORE GRAPHICS	YES	♠♥♦♣ ◠ ▒ ▀ ● ┤ ← π ↑					
(OTHER FEATURES)							
SINGLE DENSITY BIT IMAGE	YES	C:\	YES	NO	YES	YES	NO
EXPANDED	YES	EXPANDED	YES	YES	YES	YES	YES
REVERSE	YES	REVERSED	YES	YES	YES	YES	YES

NO

RITEMAN R64



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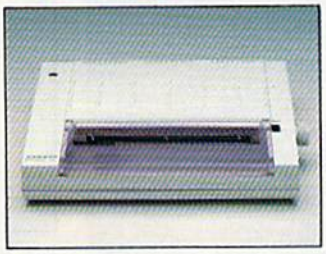

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March 1985 RUN Vol. 2, No. 3

FEATURES

26 Money Manager
This financial calculator program turns your Commodore into a computer consultant.
By Robert Baker

30 Landlord's Helper
This program lets you keep track of your real estate expenses and income while providing a realistic analysis of your investments.
By Wayne Arnett

40 Easy Invoices
This program provides the answer to every businessperson's printing problems by generating professional, ready-made invoices.
By Edward S. Wozniak

48 Mini-Calc
This miniature spreadsheet program handles 100 entries in a 10 × 10 grid, plus column and row headings.
By Tim Adcock

60 Mr. Computer Head
With this program, children can have fun altering the features of Mr. Computer Head in 3125 different ways.
By George Decker

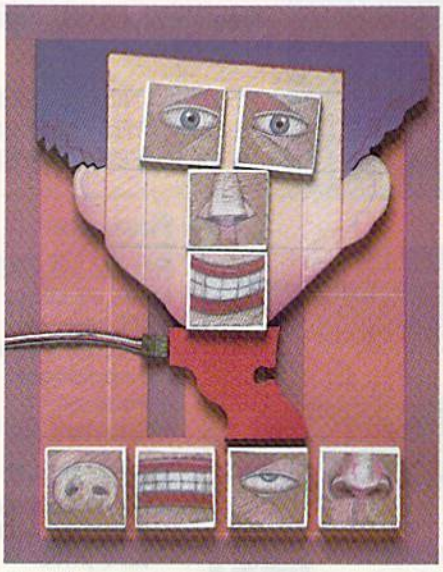
66 Making Faces
This unexpanded VIC-20 program will provide your child with hours of pleasurable and creative activity.
By Rich Beachler

77 Shape Up with Your C-64
Here are reviews of two nutrition programs and two physical-fitness programs.
By Christine Adamec

82 What You See Is What You Get
This article discusses the differences between television displays and video monitors, and poses important questions to ask.
By Tom Benford

88 One Little Word After Another
Here are reviews of thirteen word processing programs for the C-64.
By Bill Gates

104 Renumberer
This utility can save you time and greatly reduce the tedium of renumbering your programs.
By Alejandro Kapauan



Page 60

Page 6

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MPA

DEPARTMENTS

6 RUNNING RUMINATIONS
See the C-128.

8 HOW TO TYPE LISTINGS

10 MAGIC
Hints and tips that will let you perform computing wizardry.

14 SOFTWARE GALLERY
Financial Analyst
PFS:File
Robotron:2084
Seastalker
Dancing Feats
Juno First
The Tax Manager

108 COMMODORE CLINIC
A questions and answers column to help your ailing computer.

116 BOOK GALLERY
Introducing Commodore 64 Machine Code
Commodore 64 Fun and Games
VIC-20 Exposed

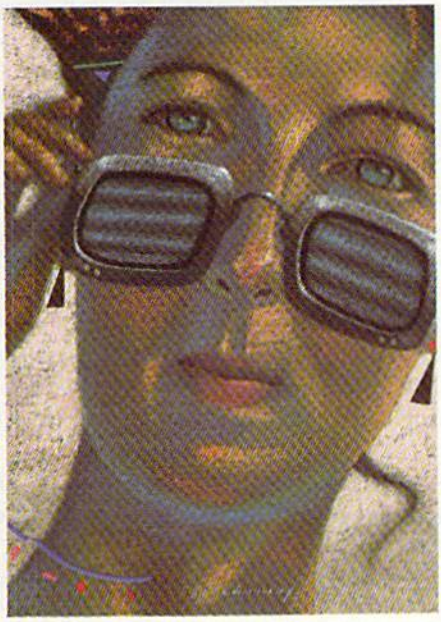
122 MAIL RUN

123 CLUBS

124 NEW PRODUCTS RUNDOWN

Page 77

Cover Photograph by ED JUDICE



Page 82

RUN Goes On-Line!

RUN magazine has just entered the telecommunications arena with our own reader feedback bulletin board, the Running Board.

Now, if you have a modem, a Commodore computer and a terminal program, you can call our bulletin board any time, day or night, seven days a week, to get the most up-to-date information about the magazine, the Commodore industry and any other tidbits that we think might be useful to our readers.

We are starting out small, but hope to grow into a service unequaled by any other magazine. We will tell you about upcoming issues, current issues, updates the minute we get them, special projects we might be cooking up and information relevant to all Commodore computer owners.

In exchange for this information, we will be asking each caller a few questions. For example, which computers you own or plan to buy, which articles you like the best or least, what kinds of topics you want us to cover in the magazine, etc. In this way, you can talk back to RUN so that we can make the magazine what you want it to be. If the idea catches on, who knows how far we might take it?

Give us a call and find out what the Running Board is all about. The number is 603-924-7632. We use a standard protocol, 300 baud, one stop bit, no parity, full duplex and a word length of eight bits. Let us know what you think; we value your feedback.

GW

The New Commodore PC

With the announcement of its newest computer at the recent CES show in Las Vegas, Commodore has launched its first foray into the so-called personal computer market. The Commodore 128, with twice the memory of the popular C-64, promises more powerful and useful applications for the Commodore computerist.

At the show, consumer reaction to the C-128 was mixed. "I've got too much money tied up in my present system to change computers," noted one attendee wandering around the Commodore booth.

Others were more receptive to the new kid on the block and enthusiastically welcomed the C-128 when Commodore officials verified that it is compatible with the C-64 software programs. "Now I can give my C-64 to my son and buy the new computer for myself," said one excited parent.

3-in-1 Computer

With the introduction of the C-128, Commodore has unleashed its most versatile computer to date. It's almost like owning three computers in one.

First, there's the C-128 itself. Sporting the sleek design of an IBM PC, the C-128 features a full-sized keyboard with a numeric keypad, an enhanced Basic, a 40/80-column option, a built-in machine-language monitor and 128K that can be expanded to 512K with an external RAM disk option.

At the flick of a switch, you can turn your C-128 into a C-64. The memory capacity of the C-128 is halved, but your computer is now compatible with the entire line of C-64 peripherals and is capable of running C-64's games, graphics, music software and more.

The C-128 also features a CP/M mode, which opens up CP/M software availability to run such programs as WordStar, dBase II and the Perfect line of software.

Uses

The new machine is being touted as ideal for businessmen, students and home users. Of course, as you may recall, the C-64 was also billed as well-suited for home, business and educational use. But the C-128's claim is much more substantiated. With a 40/80-column color display, expandability to 512K and serious software available, this is a computer that could readily be used effectively in a business environment. Indeed, it offers so many excellent features that almost any computerist will find something to his liking about the C-128.

But perhaps the most attractive feature of the C-128 will be the price, which Commodore has not yet finalized, but which promises to be well under that of the nearest competitors—the Apple IIc and the IBM PCjr. If so, the C-128 will attract anyone who is thinking of upgrading his C-64 or who is looking for more serious computer applications than the C-64 affords.

The newly introduced peripherals, too, lend credence to the image of the 128 as a more serious computer. With a mouse; a faster, 350K disk drive; a monochrome monitor; an RGB color monitor; and 1660 and 1670 modems, as well as the recently announced daisywheel printer, the DPS-1101 (see January 1985 *RUN*, p. 80), the new C-128 owner will be well-equipped for business and telecommunications, as well as home and educational applications.

A Plucky Company

Firmly entrenched as the leader in the low-cost home computer market, Commodore is entering the higher-priced arena to tackle IBM and Apple for a share of the lucrative market that most analysts predict exists.

In the ad that first announced its new computer, Commodore takes Apple and IBM head on and lists capabilities of the C-128 not found in the Apple IIc and IBM PCjr. With its history of offering quality equipment at the lowest prices possible, Commodore states that the C-128 spells good news for the industry, but "bad news for IBM and Apple."

In describing the 128 as its first "personal computer," Commodore appears to be straddling both the home and business markets. It seem to be saying, "The C-128 is not strictly a home computer, nor is it strictly a business machine. But, with its added capabilities, it can handle more advanced applications than the C-64."

In future issues, *RUN* will be taking a closer look at the C-128 and charting its progress among both readers and support manufacturers. As always, reader input is most welcome.

db

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PlayNET announces 19 exciting ways to bring people together.

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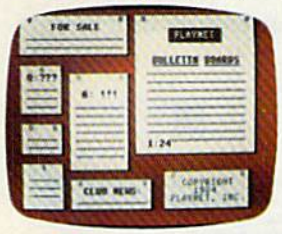
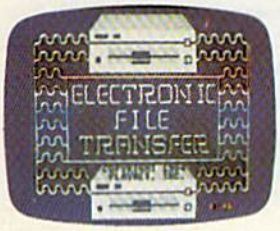


4 **FILE TRANSFER.**
You can even *transfer non-commercial programs* to other members! There is a small extra fee for this service.



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How to type listings from

RUN

Typing in listings can be difficult enough without having to worry about strange graphics characters, charts or tables. That's why we decided to make it easy to enter listings from *RUN* by translating everything we thought might be confusing in any program.

When you see something between the curly brackets, all you have to do is press the keys indicated. For example:

{SHIFT L}—means hold down the shift key and press the L key at the same time.
{COMD J}—means hold down the Commodore key (it is on the lower left side of the keyboard) and press the J key at the same time.
{SHIFT CLR}—hold down the shift key and press the CLR/HOME key.
{HOME}—press the CLR/HOME key without shifting.
{CTRL 6}—hold down the control key and press the 6 key.
{FUNCT 2}—function 2 (in this case, you hold down the shift key and press the function 1 key).
{CRSR UP}{CRSR DN}{CRSR LF}{CRSR RT}—these are the four cursor directions.
{UP ARROW}—means the arrow key (the one with the pi sign under it).
{LB.}—the British pound sign (£).
{PI}—the pi sign key (π); (shift and press the up arrow key).

In some instances, when a large number of characters or spaces are repeated in a listing, we will represent them this way: {22 spaces} or {17 CRSR LFs}.

Print vs Print#

RUN readers should be aware of difficulties that may arise when entering listings that contain the PRINT and PRINT# commands.

These two commands may look very similar, but they are different. If, for example, you use a question mark (?) to abbreviate PRINT in a line such as 10 PRINT#4,A$, then you are signaling to the Commodore computer that you are trying to print the variable #4, which is not a legal variable name.

The command PRINT#4 actually means "print to file number 4." You can abbreviate PRINT# by hitting the P key and the shift and R keys at the same time and then entering the file number. But *do not* abbreviate PRINT# with a question mark.

If you think of PRINT as one command and PRINT# as an entirely different command, then you should have no problems.

■ ■ ■

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Compiled by LOUIS F. SANDER

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If you enclose a self-addressed stamped envelope, we'll send you a Trick Writer's Guide.

There's some great magic here for you this month, whether your interest is in disk drives, printers, programming, or just in typing in a program to see what it does. As always, we match our subject matter to the interest expressed in our mail, and, basically, that's a broad cross section of computing. We think of our contributors as the most creative souls in computerdom, and month after month they prove us right. Since our contributors and readers are one and the same, that puts you in very good company. Behold what your colleagues have wrought:

$1A5 C-64 wedge feature—Commodore's famous wedge program contains a not-so-famous way of organizing files on the disk. When using the wedge to save, if you end your filename with a single character enclosed in square brackets, that character will magically be moved to the sixteenth position in the filename!

In wedge jargon, that sixteenth character is called the volume identifier. If you save several files with the same volume ID, the wedge will let you access them as a group.

If you're saving without the wedge, you can manually put a volume identifier in the sixteenth position of your filename, so you can use it later on.

To use the volume identifier, you must be running the wedge, and you can use any wedge command, including @COPY, @RENAME, @SCRATCH and especially @$. The wedge looks for the last character in each filename when you specify a volume ID between the square brackets. For example, you can save a file by entering:

{LEFT ARROW}HOUDINI[L]

It will list in the directory as

HOUDINI {8 spaces} L

and can be scratched with:

@S:HOUDINI[L] {return}

To get a directory of all files with volume identifier L, use:

@$:*[L] {return}

You can scratch all the files with volume identifier L by using

@S:*[L] {return}

Beware: The dark side of this magic is that the wedge will report the sixteenth character of the filename as the volume ID, whether it is intended as such or not. Make your IDs unique (graphics characters, for instance) and this should be no problem.

Matthew J. McCaffrey
Groton, CT

$1A6 Comma files on disk—When experimenting with disk files, simple program errors often cause difficulties with filenames. Sometimes, a file named "," pops up, which resists all efforts to be killed or renamed. When this happens, just search your directory for any other files with single-character names, then give them longer ones.

When the comma file is the only single-character name on the disk, it can be scratched or renamed by using the filename "?". The wild-card character (the ?) will match the comma and allow you to do as you wish. After the comma file has been disposed of, you can give the others their original one-character names.

Craig Brookes
Joondanna, Western Australia
(Home of the America's Cup)

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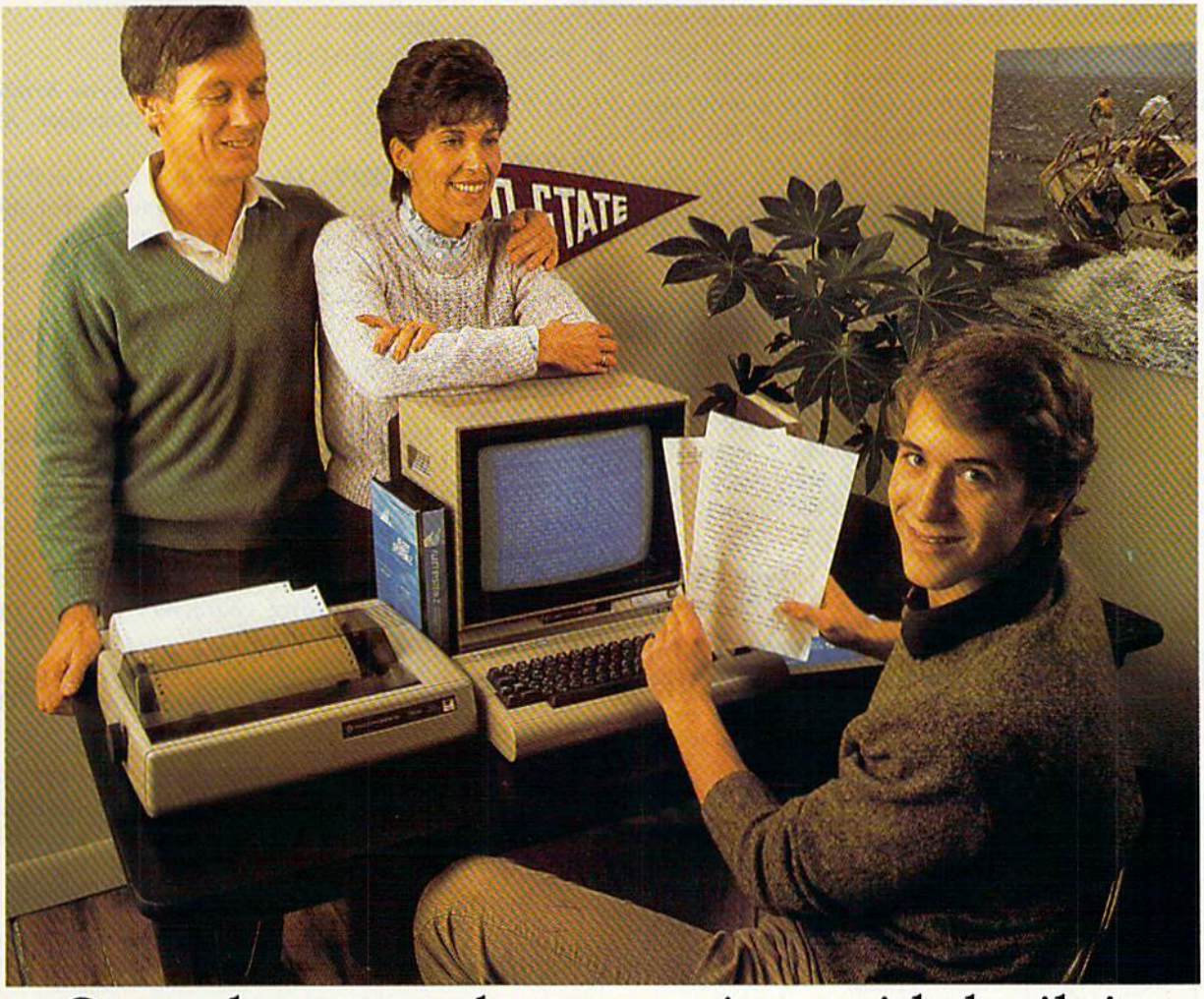

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$1A7 Dry disk storage—High humidity can cause loading problems when the felt inside your disk becomes slightly damp. You can reduce the problem by storing your disks with a desiccant capsule, such as those packed with vitamin pills. If you don't use vitamins, ask your druggist to give you a desiccant capsule.

Judith C. Fiore
Cleveland Heights, OH

$1A8 Controlling tape errors—If you're working on a program and save it to tape several times with the same name, you could be asking for trouble. When you try to load it, the computer might find an old cut-off version under the same name and give you a Load error. You can usually find the "lost" beginning of your program, but it will take you several attempts. A better solution is to use a different name each time you save a version of the program.

Julie Rhodes
Columbus, OH

$1A9 Plus/4 screen Pokes—On the C-64, screen memory starts at 1024, and color memory starts at 55296. On the new Plus/4, screen memory starts at 3072, and color memory starts at 2048. When converting C-64 programs to work on the Plus/4, just add 2048 to C-64 screen Poke locations and subtract 53248 from the C-64 color Poke locations. For example, on the C-64,

```
POKE 1524,1 (letter 'A' in center screen)
POKE 55796,2 (makes it red)
```

would convert to this on the Plus/4:

```
POKE 3572,1 (3572 = 1524 + 2048)
POKE 2548,2 (2548 = 55796 – 53248)
```

The screen map for the C-64 is on page 382 of the C-64 *Programmer's Reference Guide*. The map for the Plus/4 is on page 199 of the user's manual that comes with the computer. (The Plus/4's luminance feature may make it necessary to also change the value Poked to color memory. Ed.)

Kenneth H. Hottes
Danbury, CT

$1AA Plus/4 and C-16 tips—(Untested. Ed.) To disable the stop key, enter POKE 806,103. Return to normal by entering POKE 806,101. Unlike the 64, all keys repeat on the new machines. To emulate the 64, with only cursor keys, insert/delete and space repeating, enter POKE 1344,0. Return to flying text by entering POKE 1344,128.

Empty the keyboard buffer with POKE 239,0. Keypresses are detected at memory location 2038, much as they are in the C-64 and VIC in location 197. The values returned are generally the same as those for the 64 (see trick $3E, in *RUN*'s April 1984 issue, or run the following program and press some keys).

```
10 GETKEY A$ : PRINT A$
20 PRINT PEEK(2038) : GOTO 10
```

Wayne Arnett
Chandler, AZ

$1AB RUNDY—Have you ever typed in RUN over READY? If you have, the computer probably printed the familiar Undef'd Statement error. But if your program starts with line number zero, it will run no matter what follows RUN on the screen.

Tim Brugman
Fullerton, CA

**$1AC Improved reverse characters**—After typing CTRL 9, type in some words and look closely at them. The uppercase characters are not completely surrounded by reverse video, so they look cut off at the top. They will take on a more professional look if you put a row of COMD@ characters, CHR$(164), just above the reverse characters needing the improvement.

Perfectly Clear
Honolulu, HI

$1AD Centered printing—Trick $7F in June's *RUN* can also be accomplished using a function instead of a subroutine. You can center A$ on the screen as follows.

```
100 DEF FNC(X) = 20 – (LEN(A$)/2)
110 More program lines, if desired
120 Etc.
700 A$ = "PRESTIDIGITATION" : PRINT TAB(FNC(X));A$
710 A$ = "IS" : PRINT TAB(FNC(X));A$
720 A$ = "PLEASURABLE!" : PRINT TAB(FNC(X));A$
```

The X is a dummy argument, not used, but required to avoid a Syntax error. For the VIC, use 11 rather than 20 in line 100.

Carol A. Sowle
Fort Wayne, IN

$1AE Magic flasher—This subroutine can make all or part of your screen prompt flash on and off. It adds a little class and pizazz, with very little effort.

```
500 REM ** MAGIC FLASHER **
510 PRINT "PRESS RETURN {CTRL RVS OFF} TO
    CONTINUE"
520 PRINT "{2 CRSR UP}" : IF PEEK(162)AND32 THEN PRINT
    "{CTRL RVS}";
530 GET A$ : IF A$ = "" THEN 510
540 PRINT "{CTRL RVS OFF}" : RETURN
```

A Gosub 500 will put the prompt on the screen, with the first two words flashing. The rate of flash is set by Peeking a bit in the real time clock. For a faster rate, replace the 32 in line 520 with a 1, 2, 4, 8 or 16. For a slower rate, use 64 or 128. Moving the RVS OFF

Continued on p. 72.

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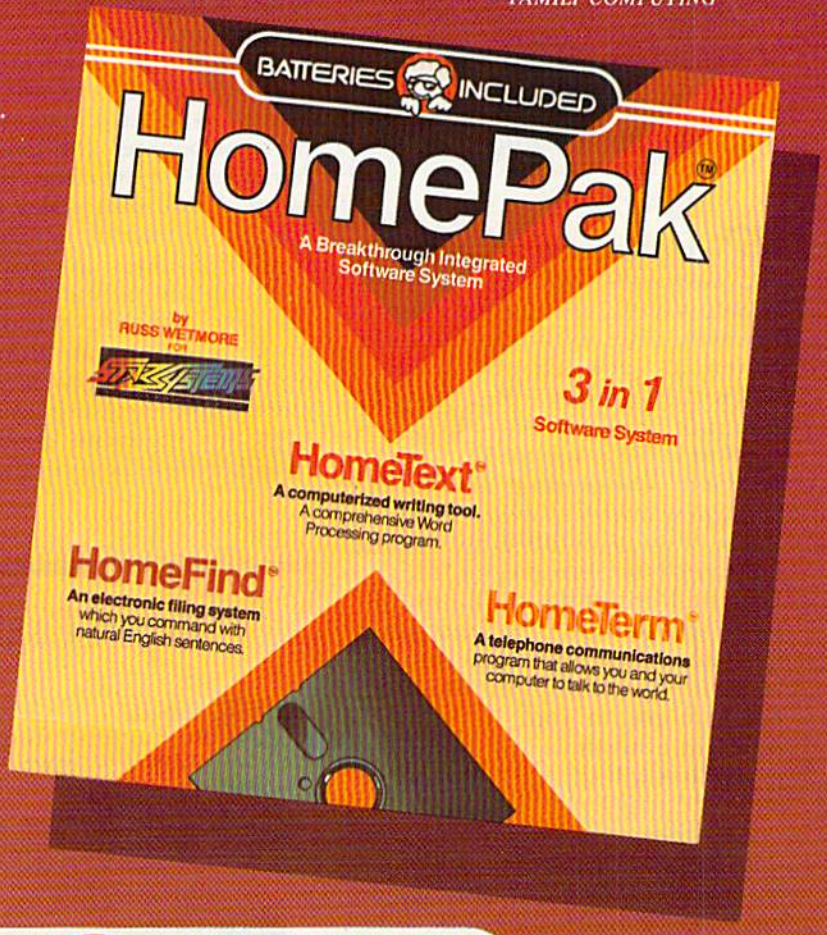
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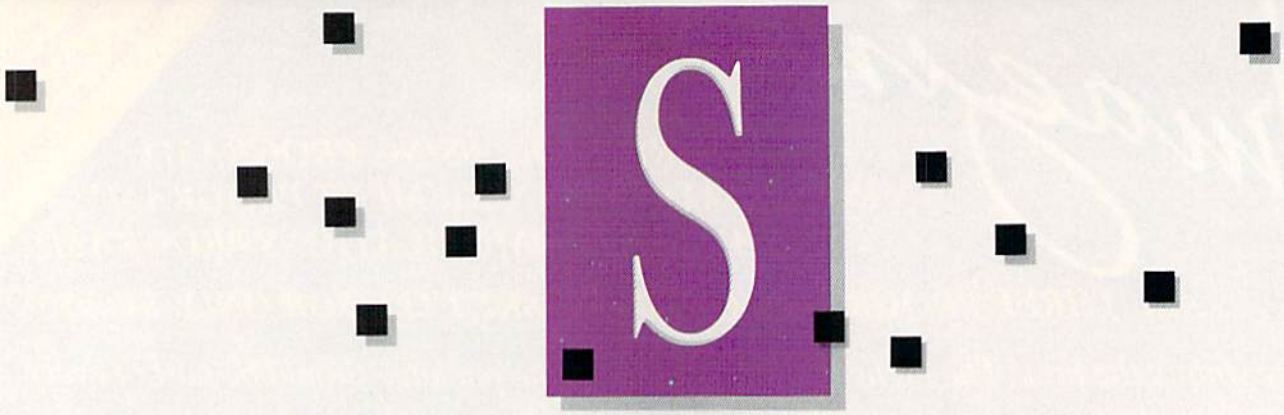


Compiled by SHAWN LAFLAMME

Financial Analyst

B

A Low-Cost Financial Package to Help You Manage Your Money

Financial Analyst is a disk-based compendium of useful programs to help you evaluate and manage your finances. Since everything is menu-driven, it's extremely easy to use. A well-written manual accompanies the disk and provides everything you need to know to use the program effectively. The package is available through mail order for only $14.95.

The Main menu offers six choices: Loan Analyzer, Investment, Monthly Deposit, Monthly Annuity, Time Deposit and Review. After you select any one of these main choices, a corresponding submenu is displayed. For example, if you choose Loan Analyzer, a submenu with the following choices will appear: Monthly Payment, Principal and Main menu.

Everything is very direct, thus minimizing the need to refer back to the manual. All you must do is supply the variable information (e.g., a desired monthly payment or the principal amount of a loan); the program handles all of the calculations automatically.

Financial Analyst also has a built-in provision for sending your data to a line printer, a handy feature for creating hardcopies of your information. To activate the Print mode, your data must first be in records to disk. The Review option from the Main menu compiles these data records on the screen and provides a prompt for printing.

The program, however, will only acknowledge two records per disk. While this effectively allows for comparisons between two items, it does require a bit more effort (in the form of additional data disks) to further compare any additional entries. This is only a minor drawback, and it shouldn't adversely affect most users.

Financial Analyst, while not offering the elaborate capabilities of some other financial programs, is indeed a user-friendly fiscal management program that represents good value. It should prove to be a worthwhile package for most home applications. *(Excelsior Software, PO Box 929, New York, NY 10272. C-64/$14.95 disk.)*

Tom Benford
Bricktown, NJ

Report Card

A ***Superb!*** An exceptional program that outshines all others.

B ***Very Good.*** One of the better programs available in its category. A worthy addition to your software library.

C ***Good.*** Lives up to its billing. No hassles, headaches or disappointments here.

D ***Mediocre.*** There are some problems with this program. There are better on the market.

E ***Poor.*** Substandard, with many problems. Should be deepsixed!

PFS: File

B

A Powerful, Easy-to-Use Database from The PFS Computing Family

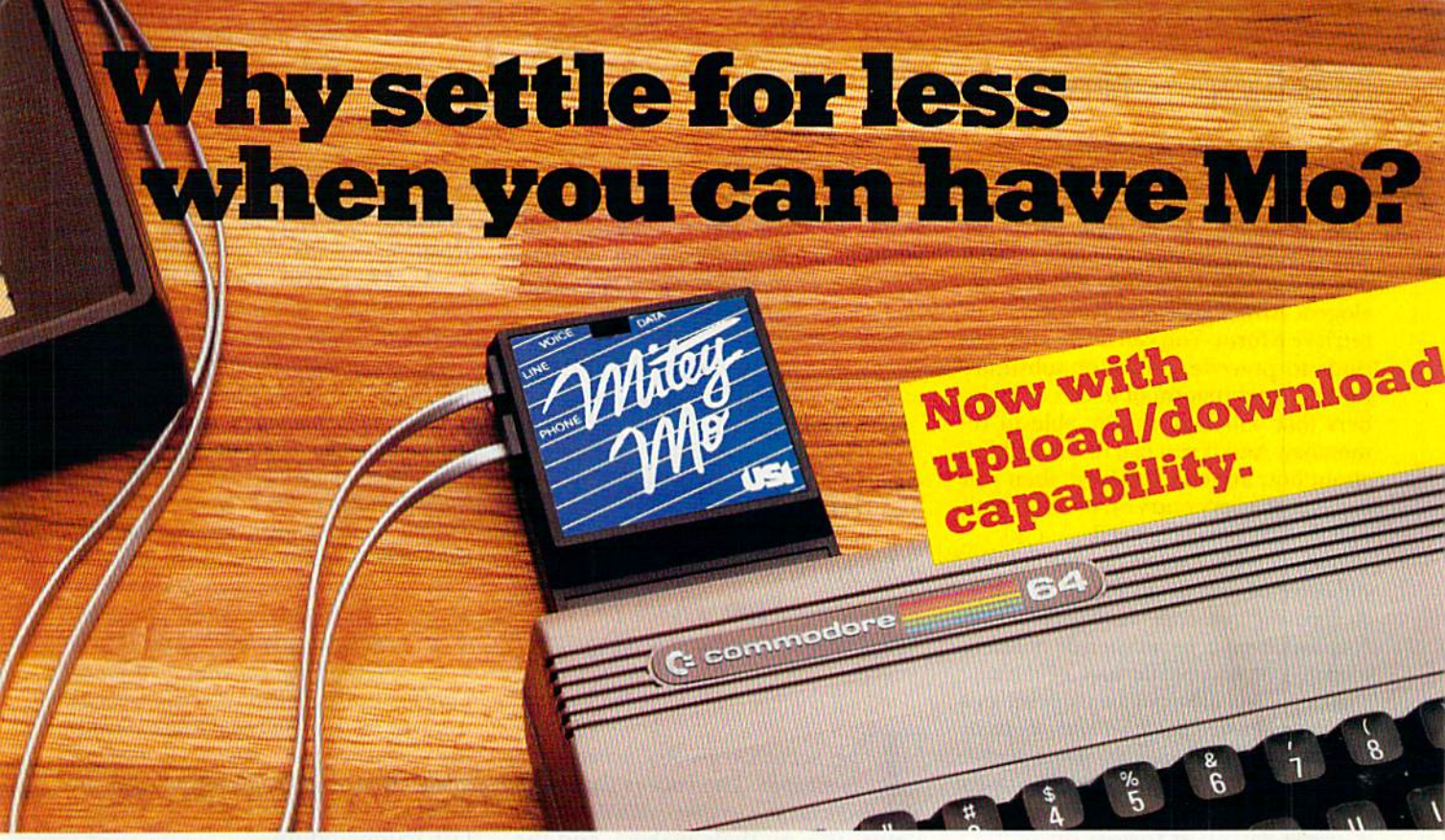
All databases simply store and list information and can be used for any number of different purposes. And one of the most useful aspects of an effective database is the ability to track down a particular record with even the smallest clue.

PFS: File is one such list manager. This user-friendly program, with its well-written and illustrated manual, allows you to create your own file and store and retrieve information with ease. Here are the options available from the Main menu.

Design File. This option allows you to either create a new file or change the design of an existing file. This is the most difficult part of the program, as you will want to include all pertinent information in the smallest amount of space.

Add. This option will bring to the screen the format that you just designed, and you may now enter your information. Depending upon the amount of data, as many as 1000 forms can be on one disk.

Why settle for less when you can have Mo?



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Until Mitey Mo, Commodore's 1650 Automodem was the obvious choice when you went looking for a modem for the C-64. Like Mitey Mo, it has "auto-answer"— it receives data while unattended. And both modems are "auto dialers"—you dial right on the computer's keyboard. But that's about where their similarity ends.

Suppose you dial a number,

and you find that it's busy. Mitey Mo has "auto redial"—it hangs up and redials immediately until it gets through. With the other modem you have to redial each time—and somebody with auto redialing can slip in ahead of you.

Mitey Mo is menu-driven. It lists the things you can do on the screen. Select a number and you're on your way. Since Automodem isn't menu-driven, you'll be hunting through the manual a lot.

Mitey Mo has only one switch, the customized software does the rest. Every family member will find it easy to use. With the other modem you'll have to remember to check three switches, otherwise you may be answering when you mean to be originating.

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Remove. This option permits the deletion of any or all forms in a file. A warning message is displayed before any item is permanently deleted, to prevent accidental loss of data.

Print. This allows you to print out either an entire form or only certain segments of a form (in a predefined, flexible format). Print specifications can be saved, so you need only design a particular print format once.

There is also a Sort function, which will organize a number of forms in ascending order. However, the fields will be printed in the order in which they appear on a particular form and cannot be juggled. To change their order, you must go to Design File.

One obvious problem with PFS: File is that you cannot create multiple files on one disk. Since a disk can hold approximately 1000 forms, using an entire disk for 20 or 30 items is a waste of time and disk space. It would be more efficient to have multiple files on the same disk, so that related small files could be grouped together (e.g., birthdays and anniversaries).

PFS: File's ease of use makes it a program worth owning. Following the tutorial in the manual should take you no longer than one hour. It is concise, clear and compact.

All PFS programs work together to form an integrated software family. PFS: Report can combine with PFS: File to further refine your records. The Report program (which only works with PFS: File) generates summaries, tables and basic math functions. PFS: File is unable to crunch numbers, so in some applications the use of the Report program will be a necessity.

Although PFS: File will not accomplish anything that you couldn't do yourself, with plenty of paper and a lot of time, it will make your record-keeping much more efficient and add a professional finish to your files. *(Software Publishing Corp., 1901 Landings Drive, Mountain View, CA 94043. C-64/$79.95 disk.)*

Howard Millman
Irvington, NY

Robotron:2084 B

The Robots Are Revolting! Can You Stop Them or Will They Rule the World?

The scenario in Robotron:2084 is simple. The robots that were created initially to help mankind suddenly turn on their makers, and the only humans left on earth are clones. Your mission is to save those remaining humans, keeping yourself alive at the same time. This is not as easy as it may sound.

You are armed with only an anti-robot laser gun, which isn't nearly enough. Your enemies are not particularly fast, but there is an endless supply of them and they have weapons of their own. The mindless grunts are the most numerous of your robot foes. They will not stop their relentless pursuit until you zap them, or until they catch you. And there are the indestructible hulks that seem to wander aimlessly—but not quite harmlessly. And watch out for the giant brains; they are not very fleet of foot, but they fire cruise missiles that will seek you out no matter where you run. Spheroids, enforcer embryos, galvanizing electrodes, cubic quarks, torturing tanks and bounce bombs all have only one mission—to kill you.

The one very simple key to playing Robotron:2084 is to shoot everything that moves. If an object doesn't vaporize and isn't an indestructible hulk, then it is most likely a clone, which you should touch (thus saving it) before it is turned into a mutant frog by a giant brain or is annihilated by a hulk. But be careful not to let anything touch you.

If you can manage to clear the grunts from the screen (as well as anything else that might be moving around), you will move onto the next level. After five levels, the giant brains appear and must be destroyed before they can launch their missiles. It doesn't end there, either. You must still fight the sinister spheroids, enforcer embryos, cubic quarks, torturing tanks and bounce bombs.

If you are coming to the conclusion that Robotron:2084 is a confusing, chaotic and frantic game, you are right. This is probably one of the most difficult shoot-'em-up games to come along. The first few times you play, don't expect to live very long. There is so much going on that you could play for hours before you discover all the aspects of the game. There is nothing educational about Robotron: 2084, nothing meaningful and no deep or hidden messages. There's just fast action and fun.

Robotron:2084 is one of the better arcade game conversions from Atarisoft. It is available on cartridge for both the C-64 and VIC-20. Although they have the same name, rules, packaging and general play-action, the C-64 version is clearly the better of the two. The VIC-20 version is a bit clumsier and the graphics are not nearly as detailed.

I would recommend Robotron: 2084 to anyone who enjoys joystick action arcade games. It will challenge even the most skillful fire-button fiends from the first minute, to the fiftieth, to the five hundredth. This is a better than average game that is frustratingly fun. *(Atarisoft, 1399 Moffett Park Drive, Sunnyvale, CA 94088. C-64, VIC/$44.95 cartridge, C-64; $29.95 cartridge, VIC.)*

Guy Wright
***RUN* Staff**

Seastalker A

There's a Traitor in Your Midst. Can You Save the Aquadome?

Seastalker is Infocom's first junior-level interactive fiction game. It is designed for ages 9 and up. The key phrase here is "and up"; it is enjoyable on an adult level, and it can serve

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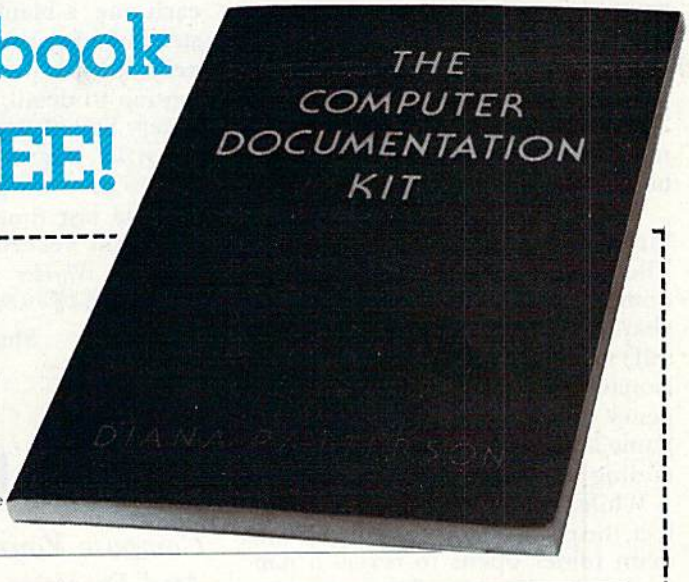

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as a painless introduction to text adventuring for the faint of heart.

In Seastalker, you are the inventor of the Scimitar, a two-seater sub that has yet to be tested under real use. While working in your lab, you receive a message from your colleagues at the Aquadome, an undersea research center, that they are in trouble. Communications are interrupted, though, and you don't know what the trouble is, other than it is serious enough to threaten the Aquadome's existence. You must find out what the problem is and solve it, using the Scimitar and the help of various crew members, one or more of whom may be traitors!

This brief synopsis gives only a hint of the scope of this adventure. The various places (lab, sub, Aquadome, Frobton Bay), the numerous characters (nine others besides yourself) and all the different equipment (sonarphone, depth finder, emergency survival kit, computestor, to name a few) give a seemingly never-ending variety to the game.

While the program is close to perfect, the packaging is even better. The main folder opens to reveal a nautical chart of Frobton Bay, at the edge of which your lab is situated. You must navigate the bay in your sub to get to open ocean and the Aquadome; there are shoals, rock spires and submerged wrecks to avoid. (Or, maybe you should investigate the wrecks instead!)

Inside the folder is the Scimitar Logbook. Two pages each are devoted to the sub itself, the lab and the Aquadome.

Also included in the folder are eight Top Secret Infocards. One side of each card gives a brief biography of some of the characters in the story; the other side has hidden clues to help you along in the game. Even the hints force you to think, however; in each one, a blank space appears instead of a key word or phrase. If you need further proof of Infocom's attention to detail, there is also a Discovery Squad Badge included.

By the way, Infocom's adventure games have no graphics, but when was the last time you read a good book that needed illustrations? *Infocom (55 Wheeler St., Cambridge, MA 02138. C-64/$49.95 disk.)*

Sharon Zardetto Aker
Sussex, NJ

Dancing Feats C

Compose Your Own Songs And Discover the Musical Potential of Your C-64

Some of the products designed to take advantage of the Commodore 64's musical ability are close to true synthesizers, while others are more simplistic, and are really just noisemakers. In the middle of this range of products is Dancing Feats from Softsync. This program allows you to compose simple pieces of music.

Dancing Feats supplies you with a backup band, to which you add the main melody, using a joystick to control the notes. From the Main menu, you can select the bass, beat, style, tempo and ending music of your backup band.

Each choice you make reveals another menu. For example, the options available to you on the Choose Beat menu are: Cool, Beguine, Syncopated and Dance.

The screen that displays the music shows eight horizontal lines, and with the combination of backup parameters that you selected playing simultaneously, you use the joystick to enter the main melody. The joystick's eight positions correspond with the standard eight-note musical octave. As you move the joystick, vertical, colored bars appear above the notes you are creating; at the bottom of these bars are the names of the notes. You can change the octave of the notes you select by pressing the fire button; a line in the lower-left corner tells you the chord of the current musical phrase. You may also dispense with the backup band and compose your music without accompaniment.

To end a composition, press the space bar to play the finale that you selected earlier.

Nothing is stored, either on disk or in the internal memory of the computer, unless you type R (for Record) at the Main menu. According to the instructions, one hour's worth of music can be stored in memory by using this command. Only one piece at a time can be in memory, so if you load one song right after another, the first will disappear. (For some reason, a cappella pieces cannot be recorded.) After storing, you can play back your composition.

The documentation supplied with Dancing Feats consists of a small pamphlet, which glosses over most musical terms with cursory definitions. The program's commands and functions are fully explained and nothing that you may need is omitted. A Command Summary at the

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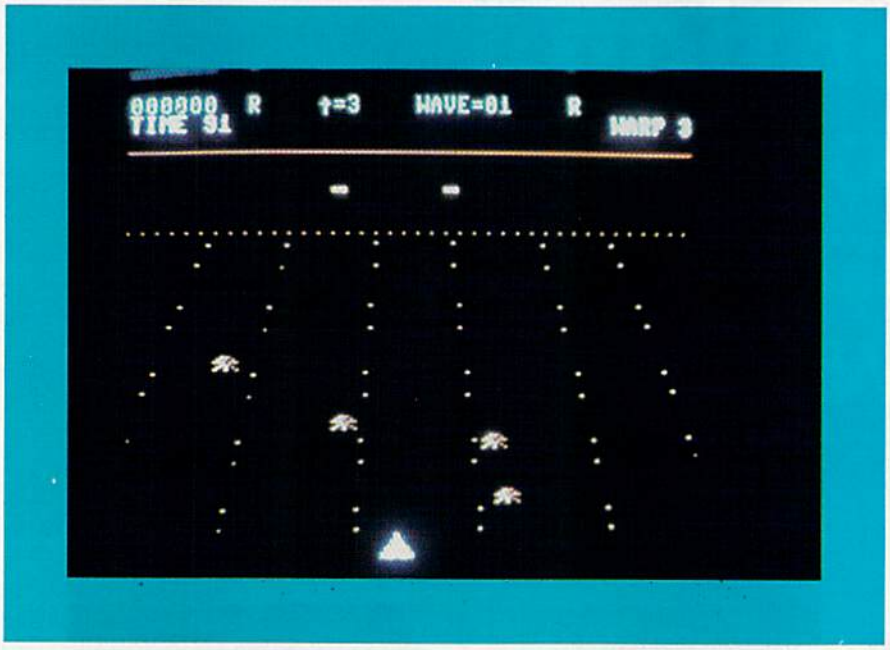

end of the instructions provides a handy reference to the program.

Dancing Feats does suffer from a few problems. The first (and most important) is that a joystick was not designed to be a musical instrument, and it sometimes slips ever so slightly, so that you wind up with two notes where you only wanted one. It would have been helpful if Softsync had allowed for the use of the keyboard as an alternative to a joystick.

Another problem is the quality of the backup band. While they never miss a beat, the rhythm section is fuzzy and the music begins to sound more or less the same no matter what selections you make in the starting menus.

Although you can enter notes as quickly as you can move the joystick, you can't make those notes last longer than a conventional eighth-note, which is very limiting if you want to compose anything more sophisticated than quick, jazzy numbers.

Also, the Save and Load functions need some work. There is no way to get a list of what compositions are on a particular disk while you are in Dancing Feats. And if you try to save a piece using the same name as a song already on the disk, Dancing Feats does not let you know that the Save was unsuccessful. A few more programming lines could have solved this problem.

Dancing Feats is billed as "The One-Man Joystick Band." Like other one-man bands I've heard, the quality of the music produced is secondary to the novelty of one person being able to mimic an entire band. While Dancing Feats is an easy way to explore some of the musical capabilities of your Commodore 64, the program's limitations may leave you frustrated before long. *(Softsync, Inc., 14 East 34th St., New York, NY 10016. C-64/$29.95 disk.)*

Anthony Townsend
Charlottesville, VA

Juno First

C

This Shoot-'em-up From Datasoft Offers Nothing New

If you like plenty of action in your games, then Juno First might be what you're looking for.

Gameplay is initiated with the joystick or joysticks (either one or two people can play). This version by Datasoft is a translation of the arcade game of the same name. If you don't remember the arcade version of Juno First, it's no surprise, as it was not a particularly popular game.

The graphics are relatively sparse and the sound effects are only mediocre, but the quality of the animation is good. The continuing challenge level of the game is fairly high, and the action is very exciting indeed!

The scenario is this: You're traveling through space at warp speed when you encounter a fleet of (presumably) hostile alien ships. These enemy ships are approaching very quickly from the horizon directly in front of you, and your job is to blast them before they can destroy you. Although the plot is fairly simplistic, accomplishing this task is far from simple. These aliens just don't quit!

The game comes on both disk and cassette in the same box. This double-media format is a good idea, since you'll always have a backup copy of the game.

If you're looking for strategy, a plot, stunning graphics or pleasant music, you'll probably have to keep on looking. On the other hand, if you just happen to have an itchy trigger finger, Juno First will give you plenty of arcade action. *(Datasoft, 19808 Nordhoff Place, Chatsworth, CA 91311. C-64/$29.95 disk and tape.)*

Tom Benford
Bricktown, NJ

The Tax Manager

A

Manage Your Taxes Effectively and Reduce Your Tax Liability

The Tax Manager is one of several tax preparation programs that allow you to enter all of your tax information into your C-64 for automatic calculation and subsequent printing of facsimile tax forms. What sets this program apart from most similar efforts is the inclusion of a tax guide to help you determine exactly which forms and schedules you are required to fill out, and a tax checklist to remind you of any deductions that you may have overlooked.

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If you're not sure which tax forms you are required or eligible to file, the tax guide takes you through a series of several yes or no questions to help you determine which forms to use. When you've completed the questionnaire, a simple keystroke will give you an on-screen list of all the necessary forms.

In order to help you take full advantage of any deductions for which you might be eligible and to ensure that you don't overlook any income that you are required to report, The Tax Manager provides a nine-category checklist. Categories include Taxable Income Items, Business or Professional Deductions, Energy Tax Credit Items, Non-Deductible Items and Items Not Taxable. Each category can be reviewed in its entirety or searched for keywords.

Once you've learned which forms you must file, what deductions you're eligible to take and the income you must declare, you are ready to begin preparing the forms. At the Tax Preparation menu you can select both the proper forms and the automatic sequence in which they should appear on the screen. Available are forms 1040, 1040EZ, 1040ES, 2106, 2210, 2119, 2441, 3468, 3903, 4625, 4797, 5695 and 6251, as well as schedules A through G, R and RP, SE and W.

While in the process of entering tax information, you can use the function keys to move back and forth among the various forms. Another useful feature of The Tax Manager is the automatic transfer of information between forms. For example, once you've calculated your net profit on Schedule C, you can return to the 1040 form to find the amount already in place on line 12 (Business Income).

At any point, all forms and information can be saved on disk or printed out. Except for the 1040, all forms and schedules are printed in acceptable IRS formats. Information from the 1040 can be printed on plain white paper and then combined with a transparency of an actual 1040 (not included in the package) to produce an acceptable copy.

Obviously, if you only file a few tax forms each year, you'll want to think twice before spending $74.95 for more options than you'll probably ever use in a lifetime. If, however, each tax season finds you buried beneath an ever-increasing pile of tax forms, then The Tax Manager could be just what you need. It is one of the most powerful and complete tax preparation programs available. *(MicroLab, Inc., 2699 Skokie Valley Road, Highland Park, IL 60035. C-64/ $74.95 disk.)*

Bob Guerra
Charlestown, MA

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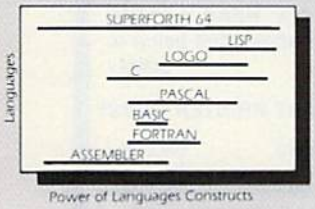

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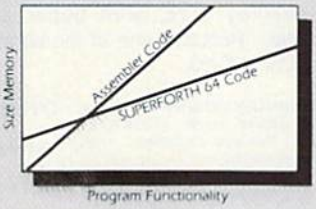

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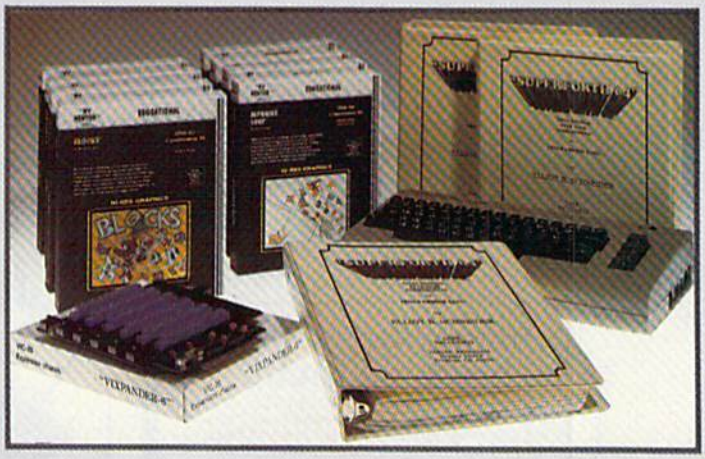

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The "Learn To Print" software package that comes with the Okimate 10 will teach you how to print your letters and artwork in a few easy steps.

Okimate 10 lets you use a wide variety of paper. Smooth paper works best for color printing. Also prints on computer paper, single sheets, letterhead, thermal paper, mailing lables, and even plastic acetate for overhead transparencies.

PLUG 'N PRINT PACKAGE

The special Plug 'N Print package is required to interface the Okimate 10 to your Commodore 64 computer. It includes everything you need to begin printing: black ribbon (prints 75 pages); color ribbon (prints 10 full-page screens); computer paper starter set; data cable; printer handbook; Learn to Print software; Color Screen Print software package; and Commodore Operating Module.

32789 Okimate 10 Color Printer **$159.95**
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32794 Black Ribbon **$5.99**
32812 Color Ribon **$6.99**

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The Edumate Light Pen and Peripheral Vision software combination from Futurehouse gives you a complete art and graphics package offering high resolution drawing performance in 16 colors with 6 brush widths, 35 pre-programmed textures (or design your own), and ZOOM feature for detail work.

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Suggested Retail Price $59.95

29962 Edumate Light Pen and Peripheral Vision ONLY **$49.95**

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Are you paying too much for diskettes? Try our first quality, prime, 5¼" diskettes (no rejects, no seconds) at these fantastic sale prices and save, save, SAVE! Disks are packaged in boxes of 50; each box contains 5 shrink-wrapped 10-packs that include diskettes in sleeves, labels, and write-protect tabs.

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All diskettes are double density and work in either single or double density drives.

32391 SS, DD Diskettes, Box of 50 $49.50-99¢ ea.!
32403 DS, DD Diskettes, Box of 50 $74.50-$1.49 ea.!

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STOP CARTRIDGE SWAPPING!!

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This Cartridge Expander plugs into the cartridge port on your Commodore 64 and lets you plug in up to three cartridges at a time. Select the program you want. Even reset the computer independently of the power switch!!

Save wear and tear on your cartridge contacts. Handy and convenient!

33227 **$34.95**

SPACE SAVING

PRINTER STAND

At last a printer stand priced for homes and small offices! We've always liked the convenience and organization of an elevated printer stand - you can put your paper underneath the stand to save valuable table space and make feeding easier. The problem, up until now, has been price. Stands sold to the office market often cost $40, $50, $60 or even more! These great new stands from Suncom, a leader in microcomputer accessories, solve the price problem and offer features not found on models costing more than twice as much. The stands feature heavy duty welded steel wire construction and have a heavy vinyl coating to reduce noise and vibration and provide an attractive appearance that will blend with your computer decor. Another plus that the designers of many more expensive stands left out: our Suncom stand holds the printer at an angle that makes it much easier to see your output as it is being printed.

We use one in our office and agree that this much convenience at such a low price is a real value. Available in two widths: 12" for most 80 column printers (Gemini 10X, RX-80, BX-80, 1526, etc.), and 18" for most 132 column printers (Gemini 15X, FX-100, etc.).

33232 12" Printer Stand **$14.95**
33246 18" Printer Stand **$22.95**

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By ROBERT W. BAKER

Everybody can use a little advice when it comes to loans and investments. This program turns your Commodore into a computer consultant.

MONEY MANAGER

In the August 1978 issue of *Kilobaud* magazine, there's an interesting financial calculator program for the old 8K PET ("FINANC: A Home/Small-Business Financial Package," by Les Palenik). I've used this program quite a lot and found it extremely helpful on more than one occasion. I decided to resurrect this program for the new group of Commodore 64 users.

During the many years I've used this program, I've been cleaning up and condensing it somewhat. I deleted the depreciation calculations, since they didn't seem appropriate for the home user, and I then combined the remaining functions into one large function menu, instead of having a number of smaller menus. I also cleaned up the print formatting and overall program flow. My version is about half the size of the original program, with about one-third the number of lines.

When you start the program, you'll see a large menu showing the various calculations that the program can perform:

INVESTMENT CALCULATIONS

1) Future value of a one-time investment
2) Future value of regular deposits
3) Regular deposits required to create a desired total value

LOAN CALCULATIONS

4) Regular payments for a loan
5) Final payment on a loan
6) Term of a loan
7) Remaining balance on a loan
8) Cost of borrowing

```
FINANCE CALCULATOR

INVESTMENT CALCULATIONS

1 — FUTURE VALUE OF ONE-TIME INVESTMENT
2 — FUTURE VALUE OF REGULAR DEPOSITS
3 — REGULAR DEPOSITS REQUIRED
    TO CREATE A DESIRED TOTAL VALUE

LOAN CALCULATIONS

4 — REGULAR PAYMENT ON A LOAN
5 — LAST PAYMENT ON A LOAN
6 — TERM OF A LOAN
7 — REMAINING BALANCE ON A LOAN
8 — COST OF BORROWING
9 — END OF PROGRAM
```

Money Manager Start-Up Menu

Simply enter the number of the desired function. From then on, the program will prompt you for any necessary information. The computed results will be displayed with all values rounded to the nearest cent. You'll then be given an option to perform another calculation of the same type, using different values.

If you don't choose another calculation, you'll be returned to the main menu, where you may select another function or press 9 to terminate the program. To keep things simple, the program does not do any input validation, nor does it protect against input errors.

Several input prompts request a time period in years and months. When answering these prompts, you must enter two numbers separated by a comma. If you accidentally enter only one value, the computer will display two question marks and let you enter the second value. If anything seems to get out of whack, try

RUN It Right

Commodore 64 or Plus/4

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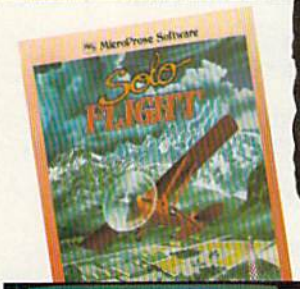
REAL LIFE CHALLENGES FOR THE AIR FORCE MAJOR — GREAT FUN AND LEARNING — FOR HIS 10 YEAR OLD SON!!!

"... Solo Flight ... has so many features that it may take months to master the program. It is an excellent buy, and a real joy for novices and old pro's alike."
— Jim Stephens, RUN

"The word that best describes Solo Flight is Fun ... it's (for those who) don't wish to spend a lot of time reading, but would rather be flying."
— David Florence, COMPUTE'S Gazette

"Solo Flight ... is a flight simulator designed with fun in mind ... it is easier to fly than Sublogic's Flight Simulator and ... it is more fun to play."
— John Anderson, Creative Computing

"Solo Flight is the BEST flight simulator I've seen for any microcomputer. And I include the Microsoft simulator for the IBM-PC ..., it will be tough to top this one!"
— Jim Bumpas, BUMPAS REVIEWS



Major Bill has over 3000 hours of flying. He loves the sophistication of the SOLO FLIGHT simulation and its real life challenges of deteriorating weather, failing instruments, and overheating engines!! He knows the reality of flight — with SOLO FLIGHT he can bring it home!!

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SOLO FLIGHT is available for Commodore-64, APPLE, IBM, and ATARI computers. Suggested retail price is only $34.95. Find SOLO FLIGHT at your local retailer, or call or write for MC/VISA, Money Order, or COD orders. Add $2.50 for postage and handling (Int'l, add $4.00 USD). MD residents add 5% sales tax.

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```
REQUIRED REGULAR DEPOSITS

ENTER THE DESIRED TOTAL VALUE:
? 25000
ENTER NOMINAL INTEREST RATE:
? 7
TERM OF INVESTMENT (YEARS, MONTHS):
? 10,120
NUMBER OF DEPOSITS PER YEAR:
? 6
REGULAR DEPOSITS: $ 96.50

VALUE OF YOUR INVESTMENT:  $ 11580.00
VALUE OF ACCUM. INTEREST:  $ 13420.00
              TOTAL VALUE:  $ 25000.00

ANOTHER CALCULATION (Y/N):
```

Option 3: Investment Calculation

stopping the program and running it again.

In the program listing, the menu display and function selection is handled by lines 230–410.

The actual functions are handled by lines 420–1340, with each function starting at the line indicated in the On...Gosub statement in line 400.

The first function starts at line 420, the second at line 520, the third at line 630 and so on.

The remaining lines, 1350–1450, form three subroutines that are used throughout the program to ask for another calculation and format output values. R

Address all author correspondence to Robert W. Baker, 15 Windsor Drive, Atco, NJ 08004.

Listing 1. *Finance Calculator program for the C-64 and Plus/4.*

```
10Ø REM ********************************
11Ø REM
12Ø REM{7 SPACEs}FINANCE CALCULATOR
13Ø REM
14Ø REM{3 SPACEs}RE-WRITTEN FROM ORIGINAL P
    ET
15Ø REM{3 SPACEs}PROGRAM THAT APPEARED IN T
    HE
16Ø REM{3 SPACEs}AUGUST 1978 ISSUE OF KILOB
    AUD
17Ø REM
18Ø REM THIS VERSION BY: ROBERT W. BAKER
19Ø REM OF 15 WINDSOR DR, ATCO, NJ Ø8ØØ4
2ØØ REM
21Ø REM ********************************
22Ø :
23Ø L1$="{CRSR DN}------------------------
    ---------------": REM 4Ø DASHES
24Ø PRINT"{SHFT CLR}{2 SPACEs}F I N A N C E
    {3 SPACEs}C A L C U L A T O R": PRINT L
    1$
25Ø PRINT"{4 SPACEs}INVESTMENT CALCULATIONS
    ": PRINT
26Ø PRINT"1 - FUTURE VALUE OF ONE-TIME INVE
    STMENT"
27Ø PRINT"2 - FUTURE VALUE OF REGULAR DEPOS
    ITS"
28Ø PRINT"3 - REGULAR DEPOSITS REQUIRED"
29Ø PRINT"{4 SPACEs}TO CREATE A DESIRED TOT
    AL VALUE":PRINT
3ØØ PRINT"{4 SPACEs}LOAN CALCULATIONS":PRIN
    T
31Ø PRINT"4 - REGULAR PAYMENT ON A LOAN"
32Ø PRINT"5 - LAST PAYMENT ON A LOAN"
33Ø PRINT"6 - TERM OF A LOAN"
34Ø PRINT"7 - REMAINING BALANCE ON A LOAN"
35Ø PRINT"8 - COST OF BORROWING": PRINT
36Ø PRINT"9 - END OF PROGRAM"
37Ø PRINT L1$: PRINT"{4 SPACEs}DESIRED FUNC
    TION (1-9): ";
38Ø GET C$: IF C$="" THEN 38Ø
39Ø V=VAL(C$): IF V=9 THEN END
4ØØ ON V GOSUB 42Ø,52Ø,63Ø,74Ø,85Ø,97Ø,1Ø8Ø
    ,12ØØ
41Ø RUN
42Ø PRINT"{SHFT CLR}FUTURE VALUE OF ONE-TIM
    E INVESTMENT": PRINT L1$
43Ø PRINT"ENTER INITIAL INVESTMENT:": INPUT
     I1
44Ø PRINT"ENTER NOMINAL INTEREST RATE:": IN
    PUT R
45Ø PRINT"TERM OF INVESTMENT (YEARS,MONTHS)
    :": INPUT Y,M
46Ø PRINT"NUMBER OF COMPOUNDING PERIODS / Y
    EAR:": INPUT N
47Ø R=R/N/1ØØ: Y=(12*Y+M)/12
48Ø T2=I1*(1+R){UP ARROW}(N*Y): T2=INT(T2*1
    ØØ+Ø.5)/1ØØ
49Ø I2=T2-I1: GOSUB 138Ø
5ØØ GOSUB 135Ø: IF A$="Y" THEN 42Ø
51Ø RETURN
52Ø PRINT"{SHFT CLR}FUTURE VALUE OF REGULAR
     DEPOSITS": PRINT L1$
53Ø PRINT"ENTER AMOUNT OF EACH DEPOSIT:": I
    NPUT D
54Ø PRINT"ENTER NOMINAL INTEREST RATE:": IN
    PUT R
55Ø PRINT"TERM OF INVESTMENT (YEARS,MONTHS)
    :": INPUT Y,M
56Ø PRINT"NUMBER OF DEPOSITS PER YEAR:": IN
    PUT N
57Ø R=R/N/1ØØ: Y=(12*Y+M)/12
58Ø T2=D*((1+R){UP ARROW}(N*Y)-1)/R
59Ø T2=INT(T2*1ØØ+.5)/1ØØ
6ØØ I1=D*Y*N: I2=T2-I1: GOSUB 138Ø
61Ø GOSUB 135Ø: IF A$="Y" THEN 52Ø
62Ø RETURN
63Ø PRINT"{SHFT CLR}REQUIRED REGULAR DEPOSI
    TS": PRINT L1$
64Ø PRINT"ENTER THE DESIRED TOTAL VALUE:":
    INPUT T2
65Ø PRINT"ENTER NOMINAL INTEREST RATE:": IN
    PUT R
66Ø PRINT"TERM OF INVESTMENT (YEARS,MONTHS)
    :": INPUT Y,M
67Ø PRINT"NUMBER OF DEPOSITS PER YEAR:": IN
    PUT N
68Ø R=R/N/1ØØ: Y=(12*Y+M)/12
69Ø D=T2*R/((1+R){UP ARROW}(N*Y)-1): D=INT(
    D*1ØØ+Ø.5)/1ØØ
7ØØ X1=D: GOSUB 143Ø: I1=D*Y*N: I2=T2-I1
71Ø PRINT"{CRSR DN}REGULAR DEPOSITS: ";X$:
    GOSUB 138Ø
```

```
REGULAR PAYMENT ON A LOAN

ENTER THE PRINCIPAL AMOUNT:
? 45000
ENTER TERM OF LOAN (YEARS, MONTHS):
? 10,120
ENTER THE ANNUAL INTEREST RATE:
? 11.5
NUMBER OF PAYMENTS PER YEAR:
? 12

REGULAR PAYMENT: $ 479.89

ANOTHER CALCULATION (Y/N):
```

Option 4: Loan Calculation

Listing 1 continued.

```
72Ø GOSUB 135Ø: IF A$="Y" THEN 63Ø
73Ø RETURN
74Ø PRINT"{SHFT CLR}REGULAR PAYMENT ON A LO
    AN": PRINT L1$
75Ø PRINT"ENTER THE PRINCIPAL AMOUNT:": INP
    UT P1
76Ø PRINT"ENTER TERM OF LOAN (YEARS,MONTHS)
    :": INPUT Y,M
77Ø PRINT"ENTER THE ANNUAL INTEREST RATE:":
     INPUT R
78Ø PRINT"NUMBER OF PAYMENTS PER YEAR:": IN
    PUT N
79Ø R=R/N/1ØØ: Y=(Y*12+M)/12
8ØØ P3=1/(1+R){UP ARROW}(N*Y): P2=P1*R/(1-P
    3)
81Ø X1=P2: GOSUB 143Ø: PRINT L1$
82Ø PRINT"REGULAR PAYMENT: ";X$: PRINT L1$
83Ø GOSUB 135Ø: IF A$="Y" THEN 74Ø
84Ø RETURN
85Ø PRINT"{SHFT CLR}LAST PAYMENT ON A LOAN"
    : PRINT L1$
86Ø PRINT"ENTER THE PRINCIPAL AMOUNT:": INP
    UT P1
87Ø PRINT"ENTER TERM OF LOAN (YEARS,MONTHS)
    :": INPUT Y,M
88Ø PRINT"ENTER THE ANNUAL INTEREST RATE:":
     INPUT R
89Ø PRINT"NUMBER OF PAYMENTS PER YEAR:": IN
    PUT N
9ØØ PRINT"ENTER AMOUNT OF REGULAR PAYMENT:"
    : INPUT P4
91Ø R=R/N/1ØØ: Y=(Y*12+M)/12: I1=N*Y
92Ø FOR I=1 TO I1: R1=INT(P1*R*1ØØ+Ø.5)/1ØØ
    : R2=P4-R1: P1=P1-R2: NEXT I
93Ø P2=P4+P1: X1=P2: GOSUB 143Ø: PRINT L1$
94Ø PRINT"LAST PAYMENT: ";X$: PRINT L1$
95Ø GOSUB 135Ø: IF A$="Y" THEN 85Ø
96Ø RETURN
97Ø PRINT"{SHFT CLR}TERM OF A LOAN": PRINT
    L1$
98Ø PRINT"ENTER THE PRINCIPAL AMOUNT:": INP
    UT P1
99Ø PRINT"ENTER AMOUNT OF REGULAR PAYMENT:"
    : INPUT P4
1ØØØ PRINT"ENTER THE ANNUAL INTEREST RATE:"
     : INPUT R
1Ø1Ø PRINT"NUMBER OF PAYMENTS PER YEAR:": I
     NPUT N
1Ø2Ø R=R/N/1ØØ: T1=1-(P1*R/P4): T2=1+R
1Ø3Ø T=-(LOG(T1)/LOG(T2))/N
1Ø4Ø M=INT(T*12): Y=INT(M/12): M=M-Y*12: PR
     INT L1$
1Ø5Ø PRINT"TERM OF LOAN: ";Y;"YEARS,";M;"MO
     NTHS": PRINT L1$
1Ø6Ø GOSUB 135Ø: IF A$="Y" THEN 97Ø
1Ø7Ø RETURN
1Ø8Ø PRINT"{SHFT CLR}REMAINING BALANCE ON A
      LOAN": PRINT L1$
1Ø9Ø PRINT"ENTER THE PRINCIPAL AMOUNT:": IN
     PUT P1
11ØØ PRINT"ENTER AMOUNT OF REGULAR PAYMENT:
     ": INPUT P4
111Ø PRINT"ENTER THE ANNUAL INTEREST RATE:"
     : INPUT R
112Ø PRINT"NUMBER OF PAYMENTS PER YEAR:": I
     NPUT N
113Ø PRINT"NUMBER OF PAYMENTS MADE:": INPUT
      I1
114Ø R=R/N/1ØØ
115Ø FOR I=1 TO I1: R1=INT(P1*R*1ØØ+Ø.5)/1Ø
     Ø: R2=P4-R1: P1=P1-R2: NEXT I
116Ø X1=P1: GOSUB 143Ø: PRINT L1$
117Ø PRINT"REMAINING BALANCE: ";X$: PRINT L
     1$
118Ø GOSUB 135Ø: IF A$="Y" THEN 1Ø8Ø
119Ø RETURN
12ØØ PRINT"{SHFT CLR}COST OF BORROWING": PR
     INT L1$
121Ø PRINT"ENTER THE PRINCIPAL AMOUNT:": IN
     PUT P1
122Ø PRINT"ENTER TERM OF LOAN (YEARS,MONTHS
     ):": INPUT Y,M
123Ø PRINT"ENTER THE ANNUAL INTEREST RATE:"
     : INPUT R
124Ø PRINT"NUMBER OF PAYMENTS PER YEAR:": I
     NPUT N
125Ø R=R/N/1ØØ: Y=(Y*12+M)/12: P3=1/(1+R){U
     P ARROW}(N*Y)
126Ø P4=P1*R/(1-P3): P4=INT(P4*1ØØ+Ø.5)/1ØØ
     : P5=P1: C=Ø: I1=N*Y
127Ø FOR I=1 TO I1: R1=INT(P5*R*1ØØ+Ø.5)/1Ø
     Ø
128Ø R2=P4-R1: P5=P5-R2: C=C+P4: NEXT I
129Ø C=C+P5: C1=C-P1: PRINT L1$
13ØØ X1=P4: GOSUB 143Ø: PRINT"{2 SPACEs}REG
     ULAR PAYMENT: ";X$
131Ø X1=C: GOSUB 143Ø: PRINT"{3 SPACEs}TOTA
     L PAYMENTS: ";X$
132Ø X1=C1: GOSUB 143Ø: PRINT"COST OF BORRO
     WING: ";X$
133Ø PRINT L1$: GOSUB 135Ø: IF A$="Y" THEN
     12ØØ
134Ø RETURN
135Ø PRINT"ANOTHER CALCULATION (Y/N):"
136Ø GET A$: IF A$<>"Y" AND A$<>"N" THEN 13
     6Ø
137Ø RETURN
138Ø PRINT L1$
139Ø X1=I1: GOSUB 143Ø: PRINT"VALUE OF YOUR
      INVESTMENT: ";X$
14ØØ X1=I2: GOSUB 143Ø: PRINT"VALUE OF ACCU
     M. INTEREST: ";X$
141Ø X1=T2: GOSUB 143Ø: PRINT"{13 SPACEs}TO
     TAL VALUE: ";X$
142Ø PRINT L1$: RETURN
143Ø X1=INT(X1*1ØØ+Ø.5)/1ØØ
144Ø X2=INT(X1): X3=(X1-X2)*1ØØ+1ØØØ
145Ø X$="$"+STR$(X2)+"."+RIGHT$(STR$(X3),2)
     : RETURN
```

By WAYNE ARNETT

Here's a program that lets you keep track of your real estate expenses and income while providing a realistic analysis of your investments.

Silent Partner, the

LANDLORD'S HELPER

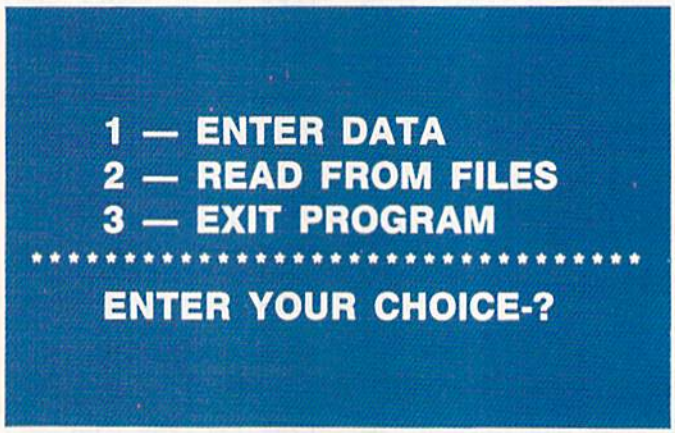
Most owners of rental property become expert painters and fair plumbers. The hardest skill to learn, however, is figuring out why the operating account always needs more money. Investing in real estate is within the reach of most working people and can be an important step toward financial security.

What the Program Does

The main purpose of Silent Partner is to report and summarize the pertinent facts about your property's operation. The printout is similar to the monthly statement a rental management company would provide. It shows all sources of income (including the "deposits by owner" category), each expense by type and amount and the resulting totals.

Each expense is broken down as a percentage of total expenses and a percentage of rental income. This helps you spot problems that might not be obvious from glancing through the checkbook ledger. If repairs are averaging 50% of income, it's time to consider selling the house while it's still standing.

The program also does some basic investment analysis. It averages cash flow and, armed with purchase price and down payment, computes gross rent multiplier and return on equity. Over a period of time, the results of these calculations reveal the fiscal facts about the performance of your investment.



Landlord's Helper Start-Up Menu

Although the program is not designed as a checkbook balancer, the printout should run a close parallel to your banking records. If you pay attention to beginning balances each month and include bank charges under miscellaneous expense, Silent Partner will get along fine with the bank.

Before printing, you can save each month's entries on a disk file. Each sequential file is automatically named by recombining the month with the first two characters of the property's address.

For example, the file containing July's entries for 912 Austin Street would be saved as "91JULY." This way, records for more than one property can be kept on the same disk.

After collecting files for a few months, several can be read into memory and totaled for a quarterly or year-end summary. This printout gives you a good perspective of long term operation by smoothing out the effects of unusual or temporary occurrences, such as a vacancy. The year-end printout is helpful in projecting future cash flow or in comparing several properties, and is especially handy at tax time.

Since most mortgage companies impound real estate tax and insurance installments along with the monthly loan payment, the program's loan category is PITI (principal, interest, taxes and insurance). When the mortgage company sends you an interest-paid notice at the end of the year, pencil in the breakdown on the year-end printout.

Don't overlook Silent Partner when considering the purchase of new or

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```
ENTER PROPERTY ADDRESS - MAX ONE LINE:
>? MILL ST
**********************************************
ENTER ANY COMMENTS OR NOTES YOU WANT
TO APPEAR ON THE PRINTOUT - MAX 2 LINES.
>? GORTS FAMILY
**********************************************
ENTER NUMBER OF MONTH OF THIS SUMMARY.
>? 1
```

Option 1: Entering Data (part 1)

SUMMARY STATEMENT: JANUARY TO JUNE
5605 CENTRAL DRIVE

NOTES:
NEW TENANT (JOHNSON) SINCE JANUARY—REPAIR INCLUDES SHOWER DOOR

INCOME AND EXPENSE

BEGINNING BALANCE		181.42
OWNER DEPOSIT(S)		10.00
RENTAL INCOME		2550.00
OTHER INCOME		17.50
TOTAL RENT & OTHER		2567.50
LOAN PMT (PITI)	1608.00	
OTHER LOAN PMTS	150.00	
UTILITIES & WATER	145.94	
LANDSCAPE	57.04	
CONDO FEE	0.00	
REPAIR & MAINT	147.83	
ADVERTISING	25.54	
MISC EXPENSE	27.00	
TOTAL EXPENSE	2161.35	
OWNER WITHDRAWAL(S)		(550.00)
ENDING BALANCE		47.57
SEC DEP LIABILITY		(100.00)
OPERATING CASH		(52.43)
CASH FLOW THIS PERIOD		406.15

EXPENSE ANALYSIS

EXPENSES:	DOLLAR AMOUNT	% TOTAL EXP.	% RENTAL INCOME
LOAN PMT (PITI)	1608.00	74.4	63.1
OTHER LOAN PMTS	150.00	6.9	5.9
UTILITIES & WATER	145.94	6.8	5.7
LANDSCAPE	57.04	2.6	2.2
CONDO FEE	00.00	0.0	0.0
REPAIR & MAINT	147.83	6.8	5.8
ADVERTISING	25.54	1.2	1.0
MISC EXPENSE	27.00	1.2	1.1
TOTAL EXPENSE	2161.35	100.0	84.8

INVESTMENT ANALYSIS

PURCHASE PRICE: $55000.00 DOWN PAYMENT: $7500.00
GROSS RENT MULTIPLIER = 10.78 AVERAGE OR PRESENT CASH FLOW: $67.69
RETURN AS AN (ANNUALIZED) PERCENTAGE OF DOWN PAYMENT: 10.8%
MONTHLY RENT NEEDED TO BREAK EVEN BASED ON CURRENT/AVE EXPENSES: $360.23

Table 1. *Sample printout of Silent Partner program.*

additional rental property. Estimate income and expense, enter asking price and down payment, and let the computer forecast the bottom line. The program can help evaluate other "what if" situations, too. Maybe you are renting a house for $500, utilities included. How would overall return be affected by offering the property at $425 with the tenant paying the electric bill? Run the program with modified figures and compare the results.

User's Manual

When the program is run, the menu presents you with two choices: enter data or read from files. When selecting the former, you supply the property's address and the month. Then each category of income and expense is displayed, prompting you for the amount. If there is no entry for a particular item, just hit the return key and the program will enter a 0.

When all the prompts have been answered, you have a chance to review the entries and correct any mistakes before continuing. After you've approved the facts and figures, the entries are saved as a file. The program is then ready to print the monthly summary.

If you select the Read From Files option, you supply the month (or the first and last months for a multimonth summary) and the first two characters of the desired property's address. The beginning balance will be picked off the first month as it's read in, and any security deposit liability is taken from the last month. The other categories are totaled for the printout.

You can take a shortcut around entering the same address, purchase price and down payment each month by first reading in a previous file. Then go to the menu and opt for the Enter Data option, which allows you to overwrite that month's numbers while preserving the other information. Since it's already in memory, you won't have to type it again.

The top and bottom function keys are used throughout the program. The f1 key returns you to the menu, and f7 causes something to happen, like starting the printer or sending a file to disk.

Silent Partner works on the Plus/4 if you make a minor addition to line 220:

```
220 F1$ = CHR$(133) : F7$ = CHR$(136) :
    KEY1, F1$ : KEY7,F7$
```

Also, since KEY is a reserved word on the Plus/4, replace the variable

KEY with FLAG in lines 470, 870, 1990 and 2400.

Fit to Your Needs

If my choice of categories doesn't fit your situation, it's easy to modify the arrays. For example, replacing condo fees with pool chemicals requires just one substitution in the Data line.

Separating taxes and insurance from the mortgage payment can be done the same way. If my printout lacks something you consider vital, such as capitalization rate or depreciation, it shouldn't be too difficult to add the calculation and have it printed.

Datassette owners can modify the Open lines at the beginning of the file read/write modules. No other changes should be necessary. I use the program with a Commodore MPS-801 printer; if your printer is non-Commodore, some brief trial and error may be needed to get the printout just right.

While Silent Partner won't rainproof a roof or keep the plumbing in good order, it will give you an indication of whether a rental should send cash flow into or out of your wallet, and some of the reasons why.

This program helps you balance the books and evaluate the performance of your invested dollars. It's flexible, easy to work with and may be the source of useful information in your financial planning. R

Address all author correspondence to Wayne Arnett, 3315 N. Apollo Drive, Chandler, AZ 85224.

Listing 1. *Silent Partner program for C-64. To run on the Plus/4, add the following to line 220:* : KEY 1, F1$: KEY 7, F7$

```
100 REM{5 SPACEs}SILENT PARTNER
110 REM{6 SPACEs}WAYNE ARNETT
120 REM
130 PRINT CHR$(142),CHR$(147)
140 PRINT TAB(11)"SILENT PARTNER"
150 PRINT TAB(11)"--------------"
160 DIM P(13),BB(12),SD(12)
170 DIM M$(12),T$(19),D(19),U(19)
180 FOR I=1TO12:READ M$(I):NEXT
190 FOR I=1TO19:READ T$(I):NEXT
200 LI$=" ********************************
    *****":REM SPACE + 38 *
210 UL$="{8 COMD Ts}":REM 8 COMM. T'S
220 F1$=CHR$(133):F7$=CHR$(136)
230 DEF FNA(X)=INT((X+.005)*100)/100
240 DEF FNB(X)=INT((X+.0005)*1000)/10
250 H1$="SUMMARY STATEMENT: "
260 DATA JANUARY,FEBRUARY,MARCH,APRIL,MAY,J
    UNE
265 :
270 DATA JULY,AUGUST,SEPTEMBER,OCTOBER,NOVE
    MBER,DECEMBER
275 :
280 DATA BEGINNING BALANCE,OWNER DEPOSIT(S)
    ,RENTAL INCOME,OTHER INCOME
285 :
290 DATA TOTAL RENT & OTHER,LOAN PMT (PITI)
    ,OTHER LOAN PMTS,UTILITIES & WATER
295 :
300 DATA LANDSCAPE,CONDO FEE,REPAIR & MAINT
    ,ADVERTISING,MISC EXPENSE
305 :
310 DATA TOTAL EXPENSE,OWNER WITHDRAWAL(S),
    ENDING BALANCE,SEC DEP LIABILITY
315 :
320 DATA OPERATING CASH,CASH FLOW THIS PERI
```

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Listing 1 continued.

```
    OD
33Ø FOR I=1TO19
34Ø FOR J=1 TO 22-LEN(T$(I))
35Ø T$(I)=T$(I)+" ":REM 1 SPACE
36Ø NEXT J,I:GOTO39Ø
365 :
37Ø REM *** MENU
375 :
38Ø PRINT"{SHFT CLR}"
39Ø PRINT:PRINT
4ØØ PRINT TAB(8)"1 - ";TAB(13)"ENTER DATA":
    PRINT
41Ø PRINT TAB(8)"2 - ";TAB(13)"READ FROM FI
    LES":PRINT
42Ø PRINT TAB(8)"3 - ";TAB(13)"EXIT PROGRAM
    ":PRINT
43Ø PRINTLI$:PRINT
44Ø PRINT TAB(7)"ENTER YOUR CHOICE - ";
45Ø INPUT R:ON R GOTO47Ø,199Ø,262Ø
455 :
46Ø REM *** PRELIMINARY INFORMATION
465 :
47Ø PRINT"{SHFT CLR}":IF KEY=Ø THEN51Ø
48Ø PRINT"THERE'S ALREADY DATA IN MEMORY. N
    EW"
49Ø PRINT"ENTRIES WILL OVER-WRITE OLD DATA.
     "
5ØØ PRINT:RT=1:GOTO247Ø
51Ø GOSUB239Ø
52Ø IF AD$<>""THEN56Ø
53Ø PRINT"ENTER PROPERTY ADDRESS - MAX ONE
    LINE:"
54Ø PRINT ">";:INPUT AD$
55Ø IF LEN(AD$)<2 THEN PRINT"MUST HAVE AN A
    DDRESS":GOTO54Ø
56Ø AD$=LEFT$(AD$,4Ø):LF$=LEFT$(AD$,2)
57Ø PRINT:PRINTLI$
58Ø PRINT"ENTER ANY COMMENTS OR NOTES YOU W
    ANT TO"
59Ø PRINT"APPEAR ON THE PRINTOUT - MAX 2 LI
    NES."
6ØØ PRINT ">";:INPUT CM$
61Ø CM$=LEFT$(CM$,8Ø)
62Ø PRINT:PRINTLI$:IF GS THEN RETURN
63Ø PRINT"ENTER NUMBER OF MONTH OF THIS SUM
    MARY."
64Ø PRINT">";:INPUT M:IF M<1 OR M>12 THEN64
    Ø
645 :
65Ø REM *** COLLECT AND PROCESS DATA
655 :
66Ø PRINT"{SHFT CLR}ENTER AMOUNTS FOR {CTRL
     9}";M$(M):PRINT
67Ø FOR I=1TO17
68Ø IF I=5 OR I=14 OR I=16 THEN I=I+1
69Ø PRINTI;TAB(4)T$(I);
7ØØ PRINT "--- ";:INPUT D(I)
71Ø IF I=2 OR I=4 THEN PRINTLI$
72Ø NEXT:PRINTLI$:ND=1
73Ø PRINT"CHECK YOUR ENTRIES - ARE THERE AN
    Y"
74Ø PRINT"MISTAKES? (Y/N)";
75Ø INPUT R$:IF LEFT$(R$,1)="Y" THEN77Ø
76Ø GOTO83Ø
77Ø INPUT"ENTER LINE NO. THAT HAS AN ERROR"
    ;R
78Ø IF R<1 OR R>17THEN77Ø
79Ø IF R=5 OR R=14 OR R=16 THEN77Ø
8ØØ PRINT"ENTER CORRECTION FOR LINE";R;
81Ø INPUT EC:D(R)=EC
82Ø PRINT"ANY OTHER MISTAKES? (Y/N)";:GOTO7
    5Ø
83Ø PRINT"{SHFT CLR}":IF PR>1ØØØ THEN86Ø
84Ø INPUT"PURCHASE PRICE";PR
```


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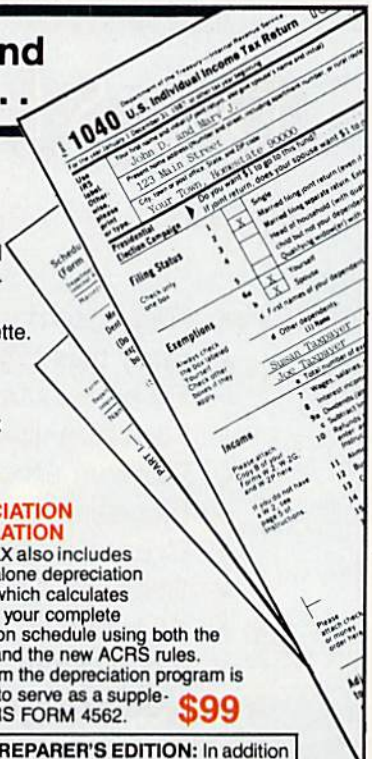

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Using either screen or printer output, SUPERTAX generates clear and concise summaries of Page 1 and 2 and Schedule A of FORM 1040 allowing you to see at a glance and to quickly comprehend your tax situation. This program also prints an OVERALL SUMMARY of the return showing Adjusted Gross Income, Itemized Deductions, Taxable Income, Regular Tax and Payment Due or Refund—all of which are calculated by the program. SUPERTAX also calculates the moving expense deduction, investment credit, taxable capital gains, political and child care credits, medical limitations, and much more. Input is fast and easy and changes can be made in seconds. This program actually makes tax planning a breeze.

FOR RETURN PREPARATION

SUPERTAX PRINTS THE INCOME TAX RETURN: This program prints page 1, page 2 of the FORM 1040, Schedules A, B, C, W and G (income averaging) of the FORM 1040 as well as FORM 3468 (investment tax credit) on standard IRS government forms or on blank computer paper for use with transparencies. Any item of input can be changed in seconds and the entire return is automatically recalculated to instantly reflect the change.

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FOR DEPRECIATION CALCULATION

SUPERTAX also includes a stand alone depreciation program which calculates and prints your complete depreciation schedule using both the old rules and the new ACRS rules. Output from the depreciation program is designed to serve as a supplement to IRS FORM 4562. **$99**

New—**PREPARER'S EDITION:** In addition to the above, the PREPARER'S EDITION prints Schedules D, E, SE and FORM 6251. It also prints preparer data at the bottom of pg. 2 of FORM 1040. **$149**

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Our Objective Was Simple

We wanted to find that printer which had all the features you could want and yet be sold directly to you at the lowest price. We wanted to give our customers the best printer on the market today at a bargain price.

The Results Are In

The search is over. We have reduced the field to a single printer that meets all our goals (and more). The printer is the GP-550CD from Seikosha, a division of Seiko (manufacturers of everything from wrist watches to space hardware). We ran this printer through our battery of tests and it came out shining. This printer *can* do it all. Standard draft printing up to a respectable (and honest) 86 characters per second, and with a very readable 9 (horizontal) by 8 (vertical) character matrix. At this rate, you will get an average 30 line letter printed in only 28 seconds.

"NLQ" Mode

One of our highest concerns was about print quality and readability. The GP-550CD has a print mode termed Near Letter Quality printing (NLQ mode). This is where the GP-550CD outshines all the competition. Hands down! The character matrix in NLQ mode is a very dense 9 (horizontal) by 16 (vertical). This equates to 14,400 addressable dots per square inch. Now we're talking ***quality*** printing. You can even do graphics in the high resolution mode. The results are the best we've ever seen. The only other printers currently available having resolution this high go for $500 and more *without* the interface or cable needed to hook up to your Commodore!

Features That Won't Quit

With the GP-550CD your computer can now print 40, 48, 68, 80, 96, or 136 characters per line. You can print in ANY of 18 font styles. You not only have the standard Pica, Elite, Condensed and Italics, but also true Superscripts and Subscripts. Never again will you have to worry about how to print H_2O or X^2. This fantastic machine will do it automatically, through easy software commands right from your keyboard. All fonts have true descenders.

One of the fonts we like best is "Proportional" because it looks most like typesetting. The spacing for thin characters like "i" and "l" are given less space which "tightens" the word making reading easier and faster. This is only one example of the careful planning put into the GP-550CD.

Do you sometimes want to emphasize a word? It's easy, just use **bold** (double strike) to make the words stand out. Or, if you wish to be even more emphatic, underline the words. Or do both. You may also wish to "headline" a title. Each basic font has a corresponding elongated (double-wide) version. You can combine any of these modes to make the variation almost endless. Do you want to express something that you can't do with words? Use graphics with your text — even on the same line.

You can now do virtually any line spacing you want. You may select 6, 8, 7½ or 12 lines per inch. PLUS you have variable line spacing of 1.2 lines per inch to infinity (no space at all) and ***97*** other software selectable settings in between. You control line spacing on a dot-by-dot basis. If you've ever had a letter or other document that was just a few lines too long to fit a page, you can see how handy this feature is. Simply reduce the line spacing slightly and . . . VOILA! The letter now fits on one page.

Forms? Yes! Your Letterhead? Of Course!

Do you print forms? No problem. This unit will do them all. Any form up to 10 inches wide. The tractors are adjustable from 4½ to 10 inches. Yes, you can also use single sheets. Plain typing paper, your letterhead, short memo forms, anything you choose. Any size under 10" in width. Multiple copies? **Absolutely!** Put forms or individual sheets with carbons (up to 3 deep), and the last copy will be as readable as the first. Spread sheets with many columns? **Of course!** Just go to condensed mode printing and print a full 136 columns wide. Forget expensive wide-carriage printers and changing to wide carriage paper. You can now do it all on a standard 8½" page.

Consistent Print Quality

Most printers have a continuous loop ribbon cartridge or a single spool ribbon which gives nice dark printing when new, but quickly starts to fade after a while. To keep the printers' output looking consistently dark, the ribbons must be changed more often than is healthy for the pocketbook. The GP-550CD solves this problem completely by using a replaceable, inexpensive ink cassette which is separately replaceable from the actual ribbon. It keeps the ribbon loaded with ink at all times. You only replace the ribbon when it truly wears out, not when it starts to run low on ink. Just another example of the superb engineering applied to the GP-550CD. (When you finally do wear out your ribbon, replacement cost is only $10.95. Ink cassette replacement cost is only $5.95, both postpaid.)

The Best Part

When shopping for a quality printer with all these features, you could expect to pay around $500 or more. *Not any more!* We have done our homework. You don't have to worry about interfaces or cables. Everything is included. We are now able to sell this fantastic printer for **only $259.95!** The GP-550CD is built especially for the Commodore 64, VIC-20, Plus 4 and C-16. All Commodore graphics are included. This printer does everything the Commodore printers do but has more features. **You need absolutely nothing else to start printing –just add paper.** We also have specific models for other computers. Call for details.

No Risk Offer

We give you a 15-day satisfaction guarantee. If you are not completely satisfied for any reason we will refund the full purchase price. A 1-year warranty is included with your printer. The warranty repair policy is to repair or replace and reship to the buyer within 72 hours.

The Bottom Dollar

The GP-550CD is only $259.95. Shipping and insurance is $8.00 — UPS within the continental USA. If you are in a hurry, UPS Blue (second day air) is $18.00. Canada, Alaska, Mexico are $25.00 (air). Other foreign is $60.00 (air). California residents add 6% tax. These are cash prices — VISA and MC add 3% to total. We ship the next business day on money orders, cashiers' checks, and charge cards. A 14-day clearing period is required for checks.

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Listing 1 continued.

```
85Ø PRINT:INPUT"DOWN PAYMENT";DP
855 :
86Ø PRINT:PRINTTAB(11)"{CTRL 9}PROCESSING D
    ATA"
87Ø KEY=1:D(5)=D(3)+D(4)
88Ø FOR I=6TO13:D(14)=D(14)+D(I):NEXT
89Ø D(16)=D(1)+D(2)+D(5)-D(14)-D(15)
9ØØ D(18)=D(16)-D(17)
91Ø D(19)=D(5)-D(14)
92Ø FOR I=1TO19:D(I)=FNA(D(I)):NEXT
93Ø IF LM>FM THEN95Ø
94Ø H2$=H1$+M$(M):GOTO96Ø
95Ø H2$=H1$+M$(FM)+" TO "+M$(LM)
96Ø IF FILE=1 THEN122Ø
97Ø PRINT"{SHFT CLR}DO YOU WANT TO RECORD A
     FILE WITH"
98Ø PRINT M$(M);"'S DATA? (Y/N)";
99Ø INPUT R$:IF LEFT$(R$,1)<>"Y"THEN122Ø
995 :
1ØØØ REM *** WRITE TO FILE
1ØØ5 :
1Ø1Ø IF LM>FM THEN1Ø4Ø
1Ø2Ø IF FILE=1 THEN1Ø7Ø
1Ø3Ø GOTO1Ø9Ø
1Ø4Ø PRINT:PRINT"MORE THAN ONE MONTH'S DATA
     IS IN"
1Ø5Ø PRINT"MEMORY. SAVING THIS WILL CAUSE F
    ILE"
1Ø6Ø PRINT"ERROR!":PRINT:GOTO243Ø
1Ø7Ø PRINT:PRINT"DON'T TRY TO RESAVE SAME D
    ATA"
1Ø8Ø PRINT:GOTO243Ø
1Ø9Ø PRINTLI$:PRINT"BE SURE DISK DRIVE IS R
    EADY TO RECORD."
11ØØ PRINT:RT=2:GOTO247Ø
111Ø CLOSE1
112Ø NA$="Ø:"+LF$+M$(M)+",S,W"
113Ø PRINT NA$:OPEN1,8,9,NA$
114Ø PRINT#1,M
115Ø FOR J=1TO13:IF J=5 THEN J=6
116Ø PRINT#1,D(J):NEXT
117Ø PRINT#1,D(15):PRINT#1,D(17)
118Ø PRINT#1,PR:PRINT#1,DP
119Ø PRINT#1,AD$
12ØØ CLOSE1:FILE=1
12Ø5 :
121Ø REM *** PRINTOUT
1215 :
122Ø PRINT"{SHFT CLR}{CRSR DN}BE SURE PRINT
    ER IS ON, AND THE PAPER"
123Ø PRINT:PRINT"POSITIONED FOR AN 11 INCH
    RUN."
124Ø PRINT:PRINTLI$
125Ø IF LM>FM THEN GS=1:GOSUB58Ø:GS=Ø
126Ø PRINT:RT=3:GOTO247Ø
127Ø CLOSE3:OPEN3,4
128Ø PRINT#3,CHR$(14)H2$
129Ø PRINT#3:PRINT#3,AD$;CHR$(15)
13ØØ PRINT#3:PRINT#3,"NOTES:"
131Ø PRINT#3,CM$:CM$=""
132Ø FOR I=1TO39:PRINT#3,"- ";:NEXT
133Ø PRINT#3:PRINT#3,CHR$(14)
134Ø PRINT#3,CHR$(16)"2ØINCOME AND EXPENSE"
135Ø PRINT#3,CHR$(15):PRINT#3
136Ø M=Ø:T1=1Ø:T2=5:T3=2Ø
137Ø FOR I=1TO5:IF I=3 THEN PRINT#3
138Ø GOSUB145Ø:NEXT
139Ø T1=15:T2=Ø:T3=13
14ØØ FOR I=6TO14:GOSUB145Ø:NEXT
141Ø T1=1Ø:T2=5:T3=2Ø
142Ø FOR I=15TO19:GOSUB144Ø:NEXT
143Ø GOTO157Ø
144Ø IF I=15 OR I=17 OR D(I)<Ø THEN M=1
145Ø U(I)=ABS(D(I)):GS=1
146Ø V=U(I):GOSUB255Ø:R$=V$
147Ø L=LEN(R$):R$=RIGHT$(R$,L-1)
148Ø PRINT#3,TAB(T1)T$(I);
149Ø PRINT#3,TAB(T2)"------";
15ØØ IF M THEN152Ø
151Ø PRINT#3,TAB(T3-L)R$:GOTO153Ø
152Ø PRINT#3,TAB(T3-(L+1));"(";R$;")"
153Ø IF I=5{2 SPACEs}OR I=14 OR I=16 THEN15
    5Ø
154Ø GOTO156Ø
155Ø PRINT#3,TAB(T3+43-L);RIGHT$(UL$,L-1)
156Ø M=Ø:RETURN
157Ø PRINT#3:PRINT#3:PRINT#3,CHR$(14)
158Ø PRINT#3,CHR$(16)"22EXPENSE ANALYSIS"
159Ø PRINT#3,CHR$(15)
16ØØ PRINT#3:PRINT#3,TAB(3)"EXPENSES:";
161Ø PRINT#3,TAB(13)"DOLLAR AMOUNT";
162Ø PRINT#3,TAB(5)"% TOTAL EXP.";
163Ø PRINT#3,TAB(5)"% RENTAL INCOME"
164Ø PRINT#3
165Ø FOR I=6TO14
166Ø V=D(I):GOSUB255Ø:R1$=V$
167Ø P1=D(I)/D(14):P1=FNB(P1)
168Ø V=P1:GOSUB261Ø:R2$=V$
169Ø IF D(3)=Ø THEN R3$="N/A":GOTO172Ø
17ØØ P2=D(I)/D(3):P2=FNB(P2)
171Ø V=P2:GOSUB261Ø:R3$=V$
172Ø PRINT#3,TAB(3)T$(I);
173Ø PRINT#3,TAB(9-LEN(R1$))R1$;
174Ø PRINT#3,TAB(17-LEN(R2$))R2$;
175Ø PRINT#3,TAB(19-LEN(R3$))R3$:NEXT
176Ø IF PR<1ØØØ OR D(3)=Ø THEN 197Ø
177Ø PRINT#3:PRINT#3:PRINT#3,CHR$(14)
178Ø PRINT#3,CHR$(16)"19INVESTMENT ANALYSIS
    "
179Ø PRINT#3,CHR$(15):PRINT#3
18ØØ GRM=PR/((D(3)/ND)*12):GRM=FNA(GRM)
181Ø CF=(D(19)/ND):CF=FNA(CF)
182Ø RN=(CF*12)/DP:RN=FNB(RN)
183Ø BE=(D(14)/ND):BE=FNA(BE)
184Ø GS=Ø:V=PR:GOSUB255Ø:PR$=V$
185Ø PRINT#3,"PURCHASE PRICE: ";PR$;
186Ø V=DP:GOSUB255Ø:DP$=V$
187Ø PRINT#3,TAB(2Ø)"DOWN PAYMENT: ";DP$
188Ø PRINT#3,"GROSS RENT MULTIPLIER =";GRM;
189Ø IF CF<Ø THENCF$=STR$(CF):GOTO191Ø
19ØØ V=CF:GOSUB255Ø:CF$=V$
191Ø PRINT#3,TAB(4)"AVERAGE OR PRESENT CASH
     FLOW: ";CF$
192Ø PRINT#3,"RETURN AS AN (ANNUALIZED) PER
    CENTAGE OF DOWN PAYMENT: ";
193Ø PRINT#3,RN;"%"
194Ø V=BE:GOSUB255Ø:BE$=V$
195Ø PRINT#3,"MONTHLY RENT NEEDED TO BREAK
    EVEN BASED ";
196Ø PRINT#3,"ON CURRENT/AVE EXPENSES: ";BE
    $
197Ø CLOSE3:GOTO38Ø
1975 :
198Ø REM *** READFROM FILE
1985 :
199Ø IF KEY=Ø AND FILE=Ø THEN2Ø3Ø
2ØØØ PRINT"{SHFT CLR}THERE IS DATA IN MEMOR
    Y WHICH WILL BE"
2Ø1Ø PRINT"LOST WHILE READING FROM FILES.":
    PRINT
2Ø2Ø PRINT:RT=4:GOTO247Ø
2Ø3Ø GOSUB239Ø
2Ø4Ø PRINT:PRINT"{SHFT CLR}BE SURE DISK DRI
    VE IS READY WITH THE"
2Ø5Ø PRINT"CORRECT FILE DISK INSERTED."
2Ø6Ø PRINTLI$
```

→

Listing 1 continued.

```
2070 PRINT"ENTER NUMBER OF FIRST MONTH TO B
     E READ"
2080 PRINT"FROM FILES INTO MEMORY."
2090 PRINT:INPUT"FIRST MONTH";FM
2100 IF FM<1 OR FM>12 THEN2090
2110 PRINT:PRINT"TO READ MORE THAN ONE FILE
      (FOR A"
2120 PRINT"SUMMARY) ENTER NUMBER OF LAST MO
     NTH."
2130 PRINT"OTHERWISE, HIT RETURN WITHOUT A
     NUMBER."
2140 PRINT:INPUT"LAST MONTH";LM
2150 IF LM<2 THEN LM=FM:ND=1:GOTO2180
2160 IF LM>12 OR LM<FM THEN PRINT"INVALID":
     LM=0:GOTO2140
2170 ND=(LM-FM)+1
2180 IF LF$<>""THEN2220
2190 PRINT:PRINT"ENTER FIRST 2 CHARACTERS O
     F THE"
2200 INPUT"PROPERTY'S ADDRESS";LF$
2210 LF$=LEFT$(LF$,2)
2220 PRINT:CLOSE1
2230 FOR I=FM TO LM
2240 NA$=LF$+M$(I)
2250 PRINT NA$:OPEN1,8,9,NA$
2260 INPUT#1,M:INPUT#1,BB(I)
2270 FOR J=2TO13:IF J=5 THEN J=6
2280 INPUT#1,P(J):D(J)=D(J)+P(J):NEXTJ
2290 INPUT#1,OW:D(15)=D(15)+OW
2300 INPUT#1,SD(I)
2310 INPUT#1,AA:IF AA>1000 THEN PR=AA
2320 INPUT#1,BB:IF BB>100 THEN DP=BB
2330 INPUT#1,AD$
2340 CLOSE1:NEXTI
2350 FILE=1:D(1)=BB(FM):D(17)=SD(LM)
2360 GOTO860
2365 :
2370 REM *** SUBROUTINES
2375 :
2380 REM SET VARIABLES TO ZERO
2390 FOR I=1TO19:D(I)=0:NEXT
2400 FILE=0:KEY=0:FM=0:LM=0
2410 RETURN
2420 REM FUNCTION KEYS
2430 PRINT TAB(6)"<<< PRESS 'F1' FOR MENU >
     >>":PRINTLI$
2440 GET R$:IF R$=""THEN2440
2450 IF R$=F1$ THEN380
2460 GOTO2440
2470 PRINT TAB(6)"<<< PRESS 'F1' FOR MENU >
     >>"
2480 PRINT:PRINT TAB(12)"'F7' TO PROCEED":P
     RINTLI$
2490 GET R$:IF R$=""THEN2490
2500 IF R$=F1$ THEN380
2510 IF R$=F7$ THEN2530
2520 GOTO2490
2530 ON RT GOTO510,1110,1270,2030
2540 REM DECIMAL PLACEMENT
2550 V$=STR$(INT(V))+"."+RIGHT$(STR$(V*100)
     ,2)
2560 IF V=0 THEN V$="00.00"
2570 IF GS THEN RETURN
2580 V$="$"+RIGHT$(V$,LEN(V$)-1)
2590 IF V<0THEN V$="("+V$+")"
2600 RETURN
2610 V$=STR$(INT(V))+"."+RIGHT$(STR$(V*10),
     1):RETURN
2620 PRINT"{SHFT CLR}PROGRAM OVER - TO REST
     ART WITHOUT LOSS"
2630 PRINT"OF DATA, ENTER 'GOTO 380'"
2640 END
```


WHATEVER HAPPENED TO FAY WRAY

In the software jungle,
no copy program for the Commodore 64™
works better or copies more at any price!
Copy Q is the fastest, most reliable, and easiest-to-use.
And **Copy Q** even comes with a backup!

The NEW **Copy Q** contains a TRUE INTELLIGENT NIBBLER which copies all the information on a disk and even the newest copy protection including half tracks, track 36 +, varying data density, misordered and extra sectors, gap and sync tracks, and much more.

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Copy Q contains other features found nowhere else. **Copy Q** revirgins disks rather than erasing them. **Copy Q** also contains a utility that automatically backs up any data disk and removes all data errors in just two minutes.

It's a software protection jungle and your data and program integrity are at stake. So don't monkey around with the others. You can climb straight to the top with the NEW **Copy Q** by Q-R & D.

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Q R&D

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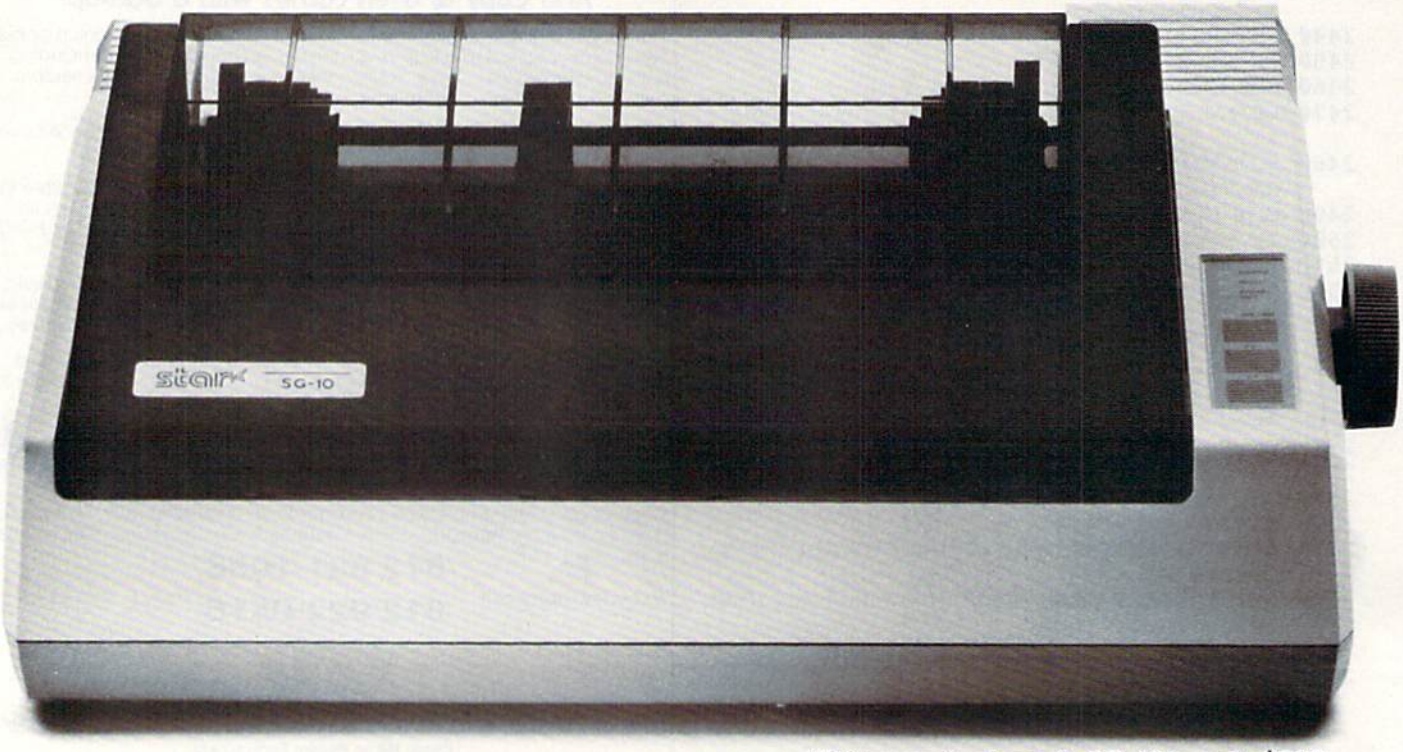
Circle 188 on Reader Service card.

Circle 92 on Reader Service card.

STAR'S NEW PRINTERS WORK 20% FASTER. COST 20% LESS. ARE 100% CERTAIN TO CHANGE YOUR MIND ABOUT PRINTERS.



This new dual-mode SG-10 is only $299.

No printer could be more appealing than one you design yourself.

And, in effect, that's what you've done.

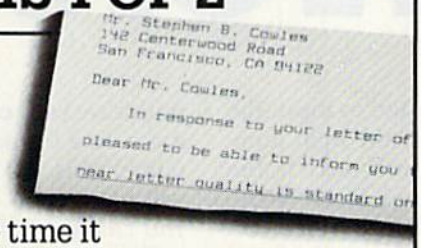
The new "S" series printers from Star Micronics have been designed not to our specifications, but to yours. With values that confound our accountants but will make great sense to you.

These printers are faster than ever. More compatible and reliable. With more added in and fewer add-ons.

And yet they cost *less*.

Don't try to figure it out. Just enjoy.

NLQ IS 1 OF 2


Mr. Stephen B. Cowles
142 Centerwood Road
San Francisco, CA 94122
Dear Mr. Cowles,
In response to your letter of
pleased to be able to inform you
near letter quality is standard

Because we've increased our printing throughput by 20%, you can now finish 6 pages in the time it used to take to print 5. And even though we've upped our speed, we've kept up our quality.

In fact, on three of our new models, both draft *and near-letter-quality* are standard (no extra charge). A fourth model, the SB-10, prints draft *and letter-quality* standard (again, not extra).

So now, with just *one* printer, you're ready for data processing and word processing. That's like owning two printers for the price of just one.

GET ON LINE BY JUST PLUGGING IN

The new Star "S" series printers are fully compatible with even the most fickle of personal computers.

And they're especially friendly with IBM®-PC, Apple,® Commodore,® and all compatibles.

In most cases, hooking up is no more complicated than putting a square peg in a square hole. But it's a lot more rewarding.

READY FOR ANY SOFTWARE

The new "S" series printers make printing as easy as 1-2-3.™ Which is just one example of the many spreadsheet programs they're ready for.

The new Stars can work with word processing programs like WordStar.® Educational software like Dr. Logo.™ And even the new integrated formats like Framework™ and Symphony.™

So Star printers match hardware to software without disk-driving you crazy.

They handle many functions faster. They're more compatible. Less expensive. More reliable. And have a full year warranty. "S" series printers have been designed with so many of your needs in mind, it's as if you'd done it yourself.

And what a great job you did.

For a free demonstration, visit your local Star dealer.

SD-10 types draft and NLQ, just $449.

SR-10 prints 200 cps for only $649.

SR-15 includes 16K memory for spreadsheets, $799.

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Prices shown are manufacturer's suggested retail prices.

By EDWARD S. WOZNIAK

Invoices are a critical part of almost every business; this program provides the answer to every business-person's invoice printing problems.

EASY INVOICES

An invoice is the most important piece of paper that is generated by a business. It establishes a record of cash flow, accounts receivable, inventory and so on.

Via your C-64 computer and printer, this program will print a professional, ready-made invoice for your customers. The original program appeared in a book entitled *Small Business Programs for the Commodore 64*, by S. Roberts, published by Elcomp Publishing, Inc. I was given permission by Elcomp's owner, Mr. Hofacker, to modify and use the program in this article.

To print out my invoices, I used a Commodore 1525E printer (10 characters per inch). However, with modifications to this program, you should be able to use any printer. You may also change the program's parameters for any layout of your choosing. Note that the program does all the calculating, right down to the invoice total, and also prints a shipping label.

The program is user-friendly and will print sections of the invoice as data is input. You must enter the date, the first invoice number (which the program will automatically increment with each new invoice), the account number, terms and so on. When you are requested to input the items sold, enter only the item number. The program will search the Data statements (lines 2010, 2020, 2030, 2040 and 2050) for the item numbers, matching description and unit price.

After the last item is printed on the invoice—for final input—type 0 and press the return key. When the invoice is completed, the program will do all the necessary calculations—add up the items, prices, shipping costs and sales tax—and deduct the discount (if you so desire). The invoice will be printed with a shipping label.

Program Line Information

Your products or services should be assigned item numbers tied to a description, with unit prices in Data statements at the end of the program. In this example, refer to lines 2010, 2020, 2030, 2040 and 2050. If you have more items to list, then continue by adding more Data statements. The final Data line must read, for example,

```
2050 DATA 0,0,0
```

for the program to run properly. Once you have established your item numbers in the program, then you must save your corrected invoice program on a formatted disk with a new name. This will be the disk that you will load to do your invoicing until you change items or pricing.

Discounts are contained in lines 700 to 730. You can alter these to suit your needs. S1 refers to the units shipped to the customer. For example, line 710:

```
IF (S1>0) AND (S1<30) THEN D=.25
```

means that if you had replied yes to the discount prompt—the quantity shipped was 25—the computer would execute line 710. Since 25 items were shipped and the quantity 25 was greater than 0 but less than 30, a 25% discount would be extended to the customer. Line 720 is 33⅓%, line 730 is 40%.

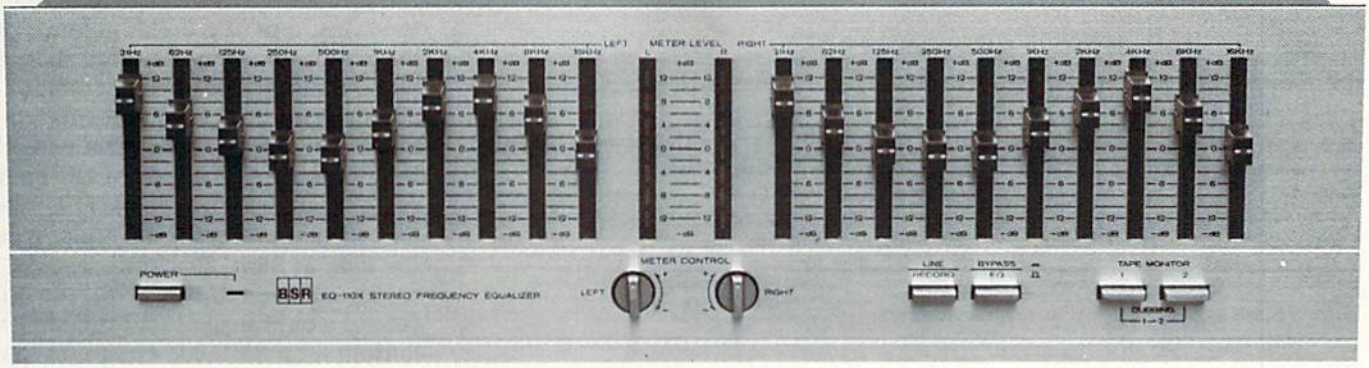
Shipping costs are contained in lines 740 to 790. You can also alter these to suit your needs. The same quantity shipped (S1) determines the shipping costs, and you can change it in the same manner as in the above paragraph.

In the example invoice (see Table 1), shipping cost was automatically calculated based on the number (S1) of items shipped. The program also asks a question as to the dollar

RUN It Right

Commodore 64 or Plus/4

$89 CLOSE-OUT



Sound Detonator Plus

Make your stereo system's sound explode with life. Improve the sound quality by 30 to 50%. Plus, you'll add tape dubbing too with this limited BSR $89 close-out.

It's like night and day. Crashing cymbals, the depth of a string bass, more trumpets or more voice will come bursting forth from your stereo at your command.

You'll make your music so vibrant that it will virtually knock your socks off when you use this professional quality 10 band stereo Sound Detonator Plus Equalizer.

It has a frequency response from 5hz to 100,000hz ± 1 db. BSR, the ADC equalizer people, make this super equalizer and back it with a 2 year limited warranty. Our $89 close-out price is just a fraction of its true $249 retail value.

CAN YOUR STEREO SOUND BETTER?

Incredibly better. Equalizers are different from regular bass and treble controls. And, 10 band EQs are the best.

Bass controls turn up the entire low end as well as the low mid-range, making the sound muddy and heavy. With an equalizer, you simply pick the exact frequencies you want to enhance.

You can boost the low-bass at 31 hz, 62hz and/or 125hz, and the mid-bass at 250hz and 500hz to animate specific areas of the musical spectrum.

And, when you boost the part of the bass you like, you don't disturb the mid-range frequencies and make your favorite singer sound like he has a sore throat.

The high frequencies really determine the clarity and brilliance of your music.

You can boost the mid-range and highs at 1,000hz, 2,000hz, 4,000hz, 8,000hz and 16,000hz. So, you can bring crashing cymbals to life at 16,000hz while at the same time you cut tape hiss or annoying record scratches at 8000hz.

You can also boost or cut specific mid-range frequency areas to add or subtract vocal, trumpets, guitars or whatever instrument ranges you prefer.

GREAT FOR 2 TAPE DECKS

You can push a button and transfer all the equalization power to the inputs of two tape decks. So, if you have a cassette deck in your car or a personal stereo that you wear, now you can pre-equalize your cassettes as you record them.

Now you can get all the dramatically enhanced sound wherever you are. This is an especially great feature for bass starved portables and high-end starved car stereos to make them come alive.

And, look at this. There are two tape inputs and outputs, so you can dub from tape deck A to B, or make two tapes at once with or without equalization.

EASY HOOK UP

Use your tape monitor circuit, but don't lose it. Now your one tape monitor circuit lets you connect two tape decks.

Just plug the equalizer into the tape 'in' and 'out' jacks on your receiver. We even supply the cables.

As you listen to your records, FM or 'aux', any time you push the tape monitor switch on your receiver you'll hear your music jump to life.

The output from your receiver is always fed directly to your tape decks for recording, and with the touch of a button, you can choose to send equalized or non-equalized signal to your recorders.

When you want to listen to a tape deck, just press a tape monitor button on the equalizer and your tape deck will work **exactly** as it did before. Except, that now you can choose to listen with or without equalization and you can dub.

You won't be listening to any distortion or hum. The Sound Detonator Plus has a 95db signal to noise ratio and total harmonic distortion of just 0.018%

Once you've set your equalizer controls, switch it in and out of the system. You'll hear such an explosive improvement in sound, you'll think you've added thousands of dollars of new equipment.

WHY A CLOSE-OUT?

Last year DAK closed out over 18,000 of BSR's 7 band equalizers because BSR had decided to only sell equalizers under their ADC name and they still had some left with the BSR name on them.

Well, as Detroit comes out with new cars each year, ADC comes out with new equalizers. We got them to supply us with just 15,000 of last year's model before they shut down for the new one.

They had already paid for all the tooling, all the research and design, so we were able to buy these for less than half the normal price, for cold hard cash.

So, you can go to any HiFi store and buy this year's design in an ADC equalizer made by the parent company BSR, or you can get this $249 value BSR equalizer while our limited supply lasts, for $89.

THE FINAL FACTS

There are 20 slide controls, each with a bright LED to clearly show its position. Each control will add or subtract up to 12db. (That's a 24db range!)

There are separate sound detonation slide controls for each channel at 31 hz, 62hz, 125hz, 250hz, 500hz, 1,000hz, 2000hz, 4000hz, 8000hz, and 16,000hz.

LED VU meters with ± 0.5db accuracy show levels for each channel. It is 17" wide, 6½" deep and 4½" tall.

PUT LIFE INTO YOUR MUSIC RISK FREE

Prepare for a shock the first time you switch in this equalizer. Instruments you never heard in your music will emerge and bring a lifelike sound that will envelop you and revolutionize your stereo system.

If your system doesn't spring to life, simply return the equalizer within 30 days in its original box for a refund.

To order your Sound Detonator Plus Tape Dubbing BSR 110X 10 Band Stereo Frequency Equalizer risk free with your credit card, call toll free or send your check not for ADC's $249 value, but for only **$89** plus **$7** for postage and handling. Order No. 9724. CA res add 6% tax.

Wake up the sound in your stereo. Your sound will explode with life as you detonate each frequency band with new musical life. And now you'll be in control of two tape decks as an added plus.

Dept. RN02

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For credit card orders call 24 hours a day 7 days a week
CALL TOLL-FREE. . .1-800-325-0800
8200 Remmet Ave., Canoga Park, CA 91304

ELCOMP PUBLISHING INC.
2174 W. FOOTHILL BLVD. #E
UPLAND, CA. 91786
714-623-8314

SEPT. 20 1984

ACCOUNT #: 1456

INVOICE #: 1

SOLD TO:
EDWARD S. WOZNIAK
1705 PEACOCK BLVD.
OCEANSIDE CA 92056

SHIP TO:
EDWARD S. WOZNIAK
1705 PEACOCK BLVD.
OCEANSIDE CA 92056

YOUR ORDER	TERMS	SHIPPED VIA	DATE SHIPPED
999	30 DAYS NET	UNITED PARCEL	SEPT. 20 1984

ORDER	SHIP	DESCRIPTION	PRICE	TOTAL
12	12	100 PRODUCT NO. 1	2.25	27.00
25	25	200 PRODUCT NO. 2	1.50	37.50
9	9	300 PRODUCT NO. 3	3.75	33.75
37	37	400 PRODUCT NO. 4	2.50	92.50

0 %DISCOUNT = - 0.00

THANK YOU FOR YOUR ORDER

NET AM'T	SALES TAX	FREIGHT	INVOICE TOTAL
190.75	11.45	2.00	204.20

FROM: -

REMARKS: -

ELCOMP PUBLISHING INC.
2174 W. FOOTHILL BLVD. #E
UPLAND, CA 91789

TO: -

EDWARD S. WOZNIAK
1705 PEACOCK BLVD.
OCEANSIDE CA 92056

Table 1. *Example invoice (includes 6% sales tax on net amount, excluding freight).*

Listing 1. *Business Invoice program.*

```
1 REM C. BY ELCOMP PUBLISHING INC. 1983
5 REM APPROVAL GIVEN TO WOZNIAK BY ELCOMP T
  O USE THIS PROGRAM
1Ø REM BUSINESS INVOICE PROGRAM--DON'T{2 SP
   ACEs}USE PUNCTUATIONS ON CUSTOMER INPUT
   INFO
1ØØ REM MODIFIED FOR INDIVIDUAL USAGE-BY E.
    S.WOZNIAK-LOAD "BUS INV",8
11Ø OPEN 1,4
18Ø PRINT"{SHFT CLR}"
19Ø INPUT"ENTER TAX RATE (%)";TR:TR=TR/1ØØ
2ØØ INPUT"ENTER DATE";RD$
22Ø INPUT"ENTER FIRST INVOICE NO.";I1
25Ø INPUT"ENTER ACCOUNT NO. (Ø=END)";C1
26Ø IF C1=Ø THEN 16ØØ
27Ø SC=1:DC=1:D=Ø:V=Ø
28Ø INPUT"DISCOUNT YES(1) NO(Ø)";DC
29Ø INPUT"SHIPPING AUTOM. ADDED YES(1) NO(Ø
    )";SC
3ØØ IF SC=Ø THEN INPUT"HOW MUCH?";V
```

amount that should be charged for shipping costs (if the shipping costs will exceed the built-in program factors). Just type the dollar amount of the actual shipping costs that should be included in the invoice.

When inputting date information, abbreviate those months that exceed four letters (JAN, FEB, MAR, etc.). Also, don't type a comma after the day of the month; for example, type the date as Sept. 20 1984.

For additional copies of the invoice, I would suggest that you obtain fanfold (tractor-feed) computer paper that will give you an original and two copies. The additional copies are obtained by paper that doesn't require carbon. This will give you all the required copies—original to customer, second copy for your receivables file, and the third copy for your packing slip. Remember, there are shipping labels for you when the invoice is printed.

Your company's name, address, and so on is entered in lines 530 to 555 and lines 1300 to 1320.

This program has a Decimal Alignment subroutine in lines 1410 to 1570. Every business program must print dollars and cents. This subroutine aligns the decimal and adds 0 or .00 to the calculation.

If at some later date you do have preprinted invoices, this program can be tailored to print through your printer and fill in the proper spaces of your invoice. Just change the space, tab and lines to fit your own invoice in this program.

The application of sales taxes will vary by state. I would urge you to contact your local state sales tax office. This program calculates the sales tax on the cost of the freight and includes it in the sales tax. Line 1060 contains the sales tax calculation on the freight.

```
1060 M1=(T-D1+V)*TR
```

This line *includes* sales tax on freight.

```
1060 M1=(T-D1)*TR
```

This line *excludes* sales tax on freight. Tax is calculated on the net amount (total amount less discount, if any).

For those of you who do not want to type in this program, please send me a formatted disk from your 1541 disk drive, along with a self-addressed, stamped return mailer and a check for $5 to cover copying costs, and I'll mail a copy to you. R

Address all author correspondence to Edward S. Wozniak, 1705 Peacock Blvd., Oceanside, CA 92056.

Listing 1 continued.

```
31Ø INPUT"CUSTOMERS ORDER NO.";CO$
32Ø INPUT"NAME OF CUSTOMER";S1$
34Ø INPUT"NUMBER AND STREET";S2$
36Ø INPUT"CITY*STATE*ZIP-CODE";S3$
37Ø PRINT
38Ø INPUT"1=3Ø DAYS NET,2=COD,3=PREPAID";TE
39Ø IF TE=1 THEN TE$="3Ø DAYS NET"
4ØØ IF TE=2 THEN TE$="C O D"
41Ø IF TE=3 THEN TE$="PREPAID"
42Ø PRINT:PRINT"1=FORWARDER,2=UNITED PARCEL
   ":INPUT"3=PARCEL POST";SV
43Ø IF SV=1 THEN SV$="FORWARDER"
44Ø IF SV=2 THEN SV$="UNITED PARCEL"
45Ø IF SV=3 THEN SV$="PARCEL POST"
46Ø PRINT"{SHFT CLR}":PRINTS1$:PRINTS2$:PRI
   NTS3$
47Ø PRINT:INPUT"SHIP TO SAME ADDRESS";Q$
48Ø IF Q$="Y" THEN 51Ø
49Ø PRINT:INPUT"NAME";H1$:INPUT"NO.AND STR.
   ";H2$:INPUT"C.,ST.,ZIP";H3$
5ØØ GOTO52Ø
51Ø H1$=S1$:H2$=S2$:H3$=S3$
52Ø FOR Q=1 TO 3:PRINT#1:NEXT Q
53Ø PRINT#1,TAB(29);"ELCOMP PUBLISHING INC.
   "
54Ø PRINT#1,TAB(28);"2174 W. FOOTHILL BLVD.
    #E"
55Ø PRINT#1,TAB(32);"UPLAND, CA. 91786"
555 PRINT#1,TAB(34);"714-623-8314"
56Ø PRINT#1:PRINT#1:PRINT#1
565 PRINT#1,SPC(55);RD$
57Ø PRINT#1
575 PRINT#1,SPC(3);"ACCOUNT #:";C1;SPC(25);
   "INVOICE #:";I1
58Ø PRINT#1:PRINT#1
585 PRINT#1,TAB(3);"SOLD TO:-";TAB(32);"SHI
   P TO:-"
59Ø PRINT#1,SPC(6);S1$;SPC(41-LEN(S1$));H1$
6ØØ PRINT#1,SPC(6);S2$;SPC(41-LEN(S2$));H2$
61Ø PRINT#1,SPC(6);S3$;SPC(41-LEN(S3$));H3$
62Ø PRINT#1:PRINT#1
625 FOR A=1 TO 8Ø:PRINT#1,CHR$(163);:NEXT
63Ø PRINT#1,SPC(3);"YOUR ORDER";SPC(12);"TE
   RMS";SPC(15);"SHIPPED VIA";
631 PRINT#1,SPC(8);"DATE SHIPPED"
64Ø PRINT#1,SPC(3);CO$;SPC(22-LEN(CO$));TE$
   ;SPC(2Ø-LEN(TE$));SV$;
642 PRINT#1,SPC(19-LEN(SV$));RD$
645 FOR A=1 TO 8Ø:PRINT#1,CHR$(184);:NEXT
65Ø PRINT#1,SPC(3);"ORDER";SPC(2);"SHIP";SP
   C(12);"DESCRIPTION";
651 PRINT#1,SPC(17);"PRICE";SPC(11);"TOTAL"
655 FOR A=1 TO 8Ø:PRINT#1,CHR$(163);:NEXT
66Ø PRINT"{SHFT CLR}":GOSUB 113Ø
67Ø GOSUB 83Ø
68Ø GOTO 66Ø
69Ø S1=I
7ØØ IF DC=Ø THEN 74Ø
71Ø IF (S1>Ø) AND (S1<3Ø) THEN D=.25
72Ø IF (S1>31)AND (S1<6Ø) THEN D=.33
73Ø IF S1>6Ø THEN D=.4
74Ø IF V<>Ø THEN 8ØØ
75Ø IF S1<15 THEN V=2
76Ø IF (S1>14) AND (S1<3Ø) THEN V=1.25
77Ø IF (S1>29) AND (S1<5Ø) THEN V=1.5
78Ø IF (S1>49) AND (S1<1ØØ) THEN V=2
79Ø IF S1>99 THEN V=2.5
8ØØ I1=I1+1
81Ø R=INT(D*1ØØ+.5):R$=STR$(R)
82Ø GOTO 94Ø
83Ø A=O:GOSUB 141Ø
84Ø G$=D$:L1=L
85Ø C=S1*O
86Ø A=C:GOSUB 141Ø
87Ø J$=STR$(N1):K$=STR$(S1):KK$=STR$(Z1) ⟶
```


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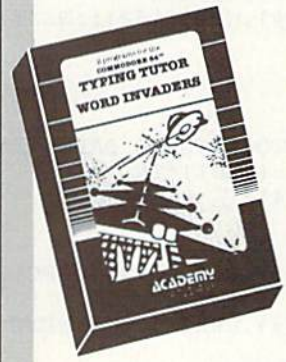

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Listing 1 continued.

```
88Ø J=LEN(J$):K=LEN(K$):KK=LEN(KK$)
89Ø PRINT#1,SPC(5-KK);Z1;
9ØØ PRINT#1,SPC(6-K);S1;SPC(8);N1;SPC(6-J);
    E$;
91Ø PRINT#1,SPC(3Ø-LEN(E$)-L1);G$;SPC(17-L)
    ;D$
92Ø C=S1*O:T=T+C
93Ø RETURN
94Ø D1=D*T
95Ø D1=INT(D1*1ØØ+.5)/1ØØ
96Ø PRINT#1
97Ø A=D1:GOSUB 141Ø
98Ø PRINT#1,SPC(46-LEN(R$));R;SPC(2);"%DISC
    OUNT= -";SPC(14-L);D$
99Ø FOR P=1 TO (1Ø-ZS):PRINT#1:NEXT P
1ØØØ PRINT#1,SPC(23);"THANK YOU FOR YOUR OR
     DER"
1ØØ3 FOR A=1 TO 8Ø:PRINT#1,CHR$(184);:NEXT
1ØØ5 PRINT#1,SPC(3);"NET";SPC(5);"SALES";SP
     C(52);"INVOICE"
1ØØ6 PRINT#1,SPC(3);"AM'T";SPC(4);"TAX";SPC
     (5);"FREIGHT";SPC(42);"TOTAL"
1ØØ7 FOR A=1 TO 8Ø:PRINT#1,CHR$(163);:NEXT
1Ø2Ø A=T-D1:GOSUB 141Ø
1Ø3Ø G$=D$:L1=L
1Ø4Ø A=V:GOSUB 141Ø
1Ø5Ø H$=D$
1Ø6Ø M1=(T-D1+V)*TR:REM TO EXCLUDE SALES TA
     X ON FREIGHT USE M1=(T-D1)*TR
1Ø7Ø A=T-D1+M1+V:GOSUB 141Ø
1Ø8Ø J$=D$:L2=L
1Ø9Ø A=M1:GOSUB 141Ø
11ØØ PRINT#1,SPC(8-L1);G$;SPC(7-L);D$;SPC(3
     );H$;SPC(51-L2);J$
11Ø5 FOR A=1 TO 8Ø:PRINT#1,CHR$(184);:NEXT
111Ø PRINT#1:PRINT#1
112Ø GOSUB 129Ø:I=Ø:T=Ø:GOTO 25Ø
113Ø INPUT"WHICH ITEM NO.";N1
115Ø IF N1=Ø THEN 69Ø
116Ø RESTORE
117Ø READ N,E$,O
118Ø IF N=Ø THEN 121Ø
119Ø IF N=N1 THEN 123Ø
12ØØ GOTO 117Ø
121Ø PRINT"ITEM NO. NOT FOUND !"
122Ø PRINT:PRINT:PRINT:GOTO 113Ø
123Ø INPUT"ENTER QUANTITY ORDERED ";Z1
125Ø INPUT"ENTER QUANTITY SHIPPED ";S1
127Ø I=I+S1:ZS=ZS+1
128Ø RETURN
129Ø PRINT#1,SPC(3);"FROM:->";TAB(45);"REMA
     RKS:-"
1298 PRINT#1
13ØØ PRINT#1,SPC(5);"ELCOMP PUBLISHING INC.
     "
131Ø PRINT#1,SPC(5);"2174 W. FOOTHILL BLVD.
      #E"
132Ø PRINT#1,SPC(5);"UPLAND, CA. 91786"
133Ø FOR ZV=1 TO 3:PRINT#1
134Ø NEXT ZV
1345 PRINT#1,SPC(3);"TO:->"
1348 PRINT#1
135Ø PRINT#1,SPC(5);H1$
136Ø PRINT#1,SPC(5);H2$
137Ø PRINT#1,SPC(5);H3$
138Ø PRINT"{SHFT CLR}"
139Ø ZS=Ø:S1=Ø:T=Ø:I=Ø
14ØØ RETURN
14Ø5 REM DECIMAL ALIGN SUBROUTINE
141Ø K1$="Ø"
142Ø K2$=".ØØ"
143Ø B=INT(A*1ØØ+.5)/1ØØ
144Ø D1$=STR$(B)
145Ø DØ=B*1Ø
146Ø D2=INT(DØ)
147Ø D3=DØ-D2
148Ø IF D3<.Ø9 THEN 151Ø
149Ø D$=D1$
15ØØ GOTO 157Ø
151Ø D4=INT(B)
152Ø D5=B-D4
153Ø IF D5<.Ø9 THEN 156Ø
154Ø D$=D1$+K1$
155Ø GOTO 157Ø
156Ø D$=D1$+K2$
157Ø L=LEN(D$)
158Ø RETURN
16ØØ CLOSE1:END
2ØØØ REM DATA STATEMENTS START HERE FOR PRO
     DUCT STOCK # AND UNIT PRICE
2Ø1Ø DATA 1ØØ,PRODUCT NO.1,2.25
2Ø2Ø DATA 2ØØ,PRODUCT NO.2,1.5Ø
2Ø3Ø DATA 3ØØ,PRODUCT NO.3,3.75
2Ø4Ø DATA 4ØØ,PRODUCT NO.4,2.5Ø
2Ø5Ø DATA Ø,Ø,Ø
2Ø6Ø REM LAST STATEMENT HAS TO CONTAIN Ø,Ø,
     Ø
```


Circle 243 on Reader Service card.

COOMODORE 64

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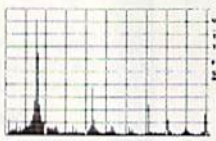

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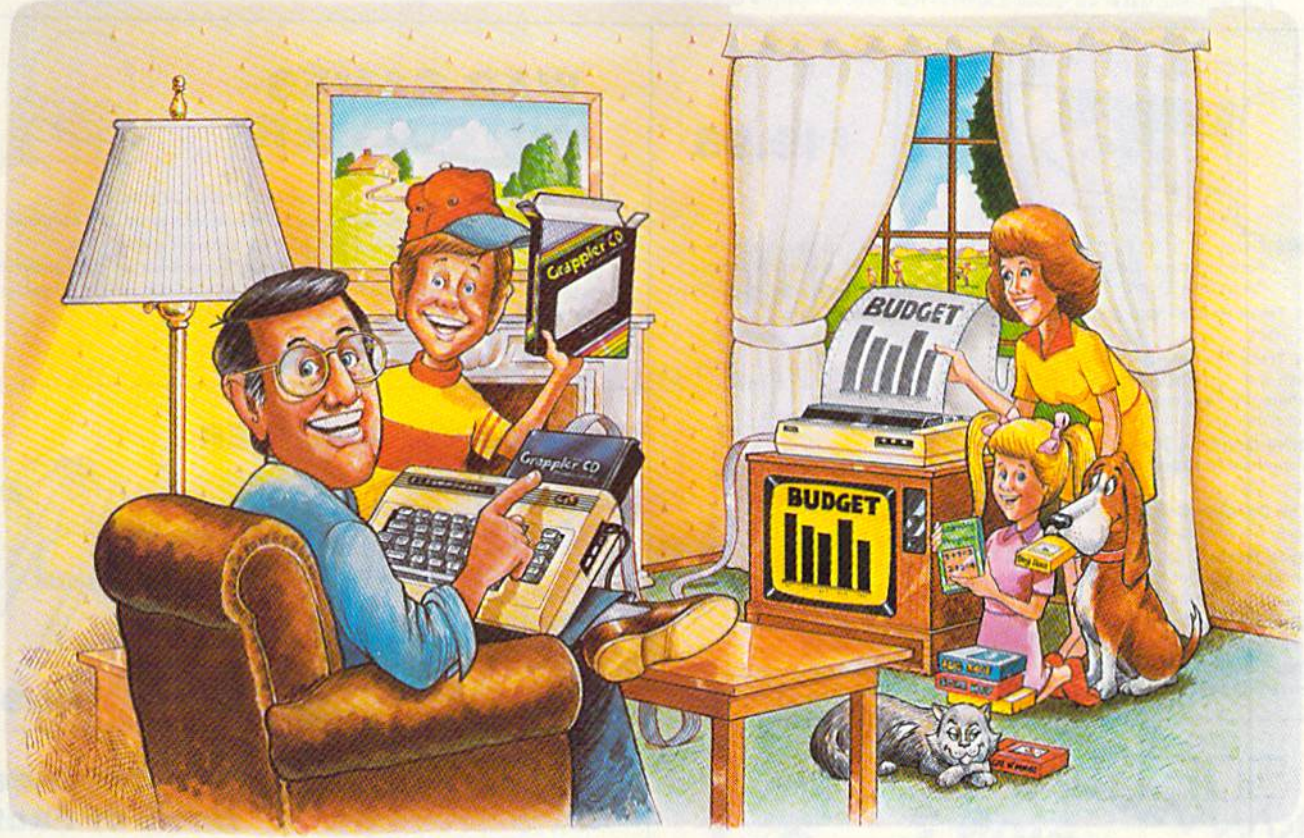

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Circle 195 on Reader Service card.

Circle 189 on Reader Service card.

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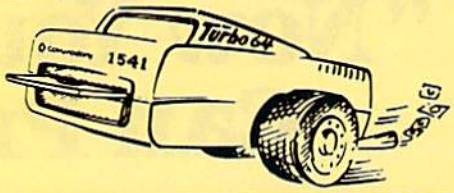

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By TIM ADCOCK

This miniature spreadsheet program handles 100 entries in a 10 × 10 grid, plus column and row headings, and is useful for calculating small tables of numbers.

MINI-CALC

As listed here, this program will only run on the VIC-20 with a Super or 3K expander. I wanted to include a stripped-down version for the 3.5K VIC, but there just wasn't enough memory.

The Format

To see the program's format, look first at Table 1.

Mini-Calc is set up just like this. When you view it, however, its appearance is slightly different.

When run, it first deletes the lines holding the Data statements (this part utilizes the *dynamic* keyboard and will be seen on the screen). It then prompts you to input row names and column names, which stay the same throughout the rest of the program. Next, "LOAD DATA?" appears. When you first run the program, press N in response, since a datafile has not even been created. After this, the screen is set up with the title (and other information) at the top and four "windows" below.

The spreadsheet is now ready. It displays the first five row names you typed in and fills all columns with zeroes. It also shows the first four column names (in blue).

To avoid any misunderstanding, columns are vertical and rows are horizontal. A row total is just a sum of all numbers in that row; likewise, a column total is the sum of all numbers in that column. The totals cannot be edited like the other numbers and are automatically updated as you work with the spreadsheet (you will see this later).

The first window holds columns A and B, while columns C and D are below in the second window. The bottom left window holds the row names, while to the right are the row totals. Below each column should be printed, in reversed black, a column total.

To see those rows not immediately visible, press the space bar. To scroll back, use the L key.

To view those columns not immediately visible, press the > and < keys; you needn't use the shift key with them. Moving to the left and right might look a little weird because I used the same assembly-language routine that I used on the up and down movement. Don't worry, though; everything is in its proper place. Just remember that the names and totals at the bottom correspond directly to the other numbers exactly the way you see them.

For example, the row name at the top of the bottom left window (and the total on the other side) is in direct relation to all numbers at the *top* of the other windows.

Entering Numbers

Now that scrolling and viewing the numbers is clear (I hope), let's enter some numbers. Press the £ (British pound sign) key, and a little window will be displayed next to "< --data entry."

Also, the *simulated cursor* (a black square) has moved from the word "scroll" to the first window. The cursor is your guide to whatever you're doing on the screen. If you want to scroll through the numbers, you must position the cursor at the word "scroll." If you want to enter numbers, you must position it beside the number you want to change and so on.

Now, type in any number, care-

RUN It Right

VIC-20
3K or Super expander
Disk drive

Victree,™ The Mighty Oak

Created for COMMODORE 64 and VIC-20 users by a programmer named Robin.

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Just plant your **VICTREE** cartridge in the cartridge port of your **C-64** or **VIC-20** machine. You'll reap a harvest of programming benefits. And that's a lot of crop!

42 Added Commands

The **VICTREE** lets you take fuller advantage of the Disk Operating System in your 1541 Disk Drive. It gives you key BASIC disk and file commands that you could not otherwise get without much greater expense. Here's a small sample:

The DIR command immediately reads the disk directory while leaving the computer's memory completely untouched, and without disturbing whatever program you're working on. Additional disk commands are:

CHAIN, EXECUTE, MERGE, SEND, USE, CONCAT, DOPEN, DCLOSE, RECORD, HEADER, COLLECT, BACKUP, COPY, APPEND, DSAVE, DLOAD, DIRectory, RENAME, SCRATCH, CATALOG, INITialize.

Other Popular Features

VICTREE has 15 commands that permit the greatest program writing and fixing ease. For writing, the toolkit of commands includes: AUTO, DELETE, RENUMBER, MERGE, LCOPY, LMOVE, PRINT USING, FIND, CHANGE, PAGE, HELP DUMP, TRACE, KILL, KILL SAVE.

The **VICTREE** allows most BASIC 4.0 programs, especially those for the older PET machines, to work on your **Commodore 64** or **VIC-20**. And for only $20 extra, **VICTREE** comes with a cable that roots you into almost any of the popular Centronics/parallel standard printers on the market today.

The VICTREE Keeps Growing

This carefully protected cartridge even has a very simple text editor that allows brief documents to be entered and printed out. We recently grafted a "Print Using" BASIC command onto it. The 1984 **VICTREE** features a new switch, too, that turns the cartridge off and restores all the memory.

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The Skyles Electric Works **PrintCable**™ that interfaces your **Commodore 64** or **VIC** to all popular printers (see pgs. 8 and 9 for more info on printers). Besides offering an absolutely amazing lowest cost Centronics style parallel interface when used with VICTREE and most programs, **PrintCable** may be used directly with many popular programs.

A partial list of programs that appear in this catalog that use the **PrintCable** directly without VICTREE includes:

BUSIDATA 64 ..... see page 5
BUSICALC 1, or 2, or 3 ..... see pages 6, 7
Omniwriter ..... see page 11
Superbase 64 ..... see page 11
MIKRO 64 ..... see page 10

A printer interface at an amazing low price.

PrintCable 64, C-64 ..... **$29.95***
PrintCable 20, VIC 20 ..... **29.95***
PrintCable 64, when purchased with programs named above **19.95***

*There is an additional $3.50 US and Canada, $10.00 Europe and Asia shipping charge per order. California residents add sales tax.

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Skyles 2+1 Expansion Bd. C-64 ..... **$49.95***
Skyles 4+1 Expansion Bd. C-64 ..... **$89.95***

Skyles Catalogue Page 2

FOR COMMODORE 64 AND VIC-20 OWNERS ONLY:

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	Col. A	Col. B	Col. C	Col. D	Col. E	...	Col. J	Total
Row 1								
Row 2								
Row 3								
.								
Row 10								

Table 1. *Sample format of Mini-Calc spreadsheet.*

Range	Description
110–210	Screen setup (windows, text, etc.).
390–460	Main control routine. Sends control to appropriate routine depending on key being pressed.
620–690	Scroll routine. Machine language pushes everything up, next information is then printed at bottom of each window.
700–750	Scroll routine. Same as above except in reverse.
800–810	Dynamic keyboard delete.
1010–1190	Data for storing machine language routines.
1200–1230	Input for row and column names.
3000–3030	Column total update after formula calculation.
4000–4040	Printing of appropriate columns and totals after formula calculation.
6000–6505	Formula entry routine. Allows only valid formula.
6510–6800	Numeric entry for independent variable (N), which can be included in formula.
6830–7115	Actual formula calculation on result column. Row totals updated accordingly.
9000–9017	Tabbing routine. Strings set up to position numbers. Other variables used for machine language decimal alignment, simulated cursor and so on.
9020–9075	Numeric Entry routine. Used for entering or changing numbers in spreadsheet. Row and column totals updated.
10000–10010	Checking routine. Assures viewing eight columns only.
10011–11000	Routine used to print adjacent columns for viewing.
16000	Save and load Datafiles routine.

Table 2. *Line ranges for each module.*

Key	Effect
Space bar	Scrolls rows upward.
L key	Scrolls rows downward.
< key	Moves to adjacent columns toward column A.
> key	Moves to adjacent columns toward column J.
£ key	Enters number into spreadsheet. Also skips over numbers if desired.
+ key	Places cursor at top of next column.
↑ key	Places cursor at "home" position for formula entry or change.
£ key	Forces a Return over formula or variable N. Nothing is erased, and formula and variable showing are used.
↑ key	Forces a Return over formula, but clears out everything to the right of cursor.
S key	Saves spreadsheet.

Table 3. *Key operations for Mini-Calc program.*

fully. If you type a number larger than six digits before the decimal, the program will accept only the first six digits and enter them automatically. Likewise, only two digits after the decimal point are accepted and entered. This assures that the number has only two decimal places and is no higher than 999999.99. The negative range is up to −99999.99 (this is usually high enough for most uses).

If your number was within range, such as 22, 35.7 or −497.2, then hit the £ key to enter it.

After the number is entered, the cursor moves down one space, ready for another entry. If you want to skip over numbers, just hold down the £ key. When you do this, you'll notice that the cursor travels through each column of numbers and back to the word "scroll." Thus, to move to any number and to enter a number, you only have to use one key, the British pound sign.

If you make an error when entering a number (for example, if you enter something like .5.65 or 5.6 – 7), the program will usually enter 0.

Another note about the automatic entry after typing two numbers past the decimal: If you want to enter whole numbers, you may type the decimal and two zeroes, and they will enter without hitting the £ key. Also, as you enter your numbers into the spreadsheet, you'll notice column and row totals being updated.

Formula Entry

Now, on to the matter of formula entry. To enter a formula, the cursor must be situated beside "scroll." Next, hit the ↑ (up-arrow) key, and the cursor will move to the home position, lying on the A. Now, you can enter any formula you choose. The format of the formula is as follows: The quantity in the result column equals any column or the letter N (*,/,−,+ or ,) any column or the letter N.

Using this format, the steps for entering the formula are as follows:

Step 1. Type in any letter A through J. This is where the result of the calculation is stored.

Step 2. Type in the = sign.

Step 3. Type any letter A through J or the letter N.

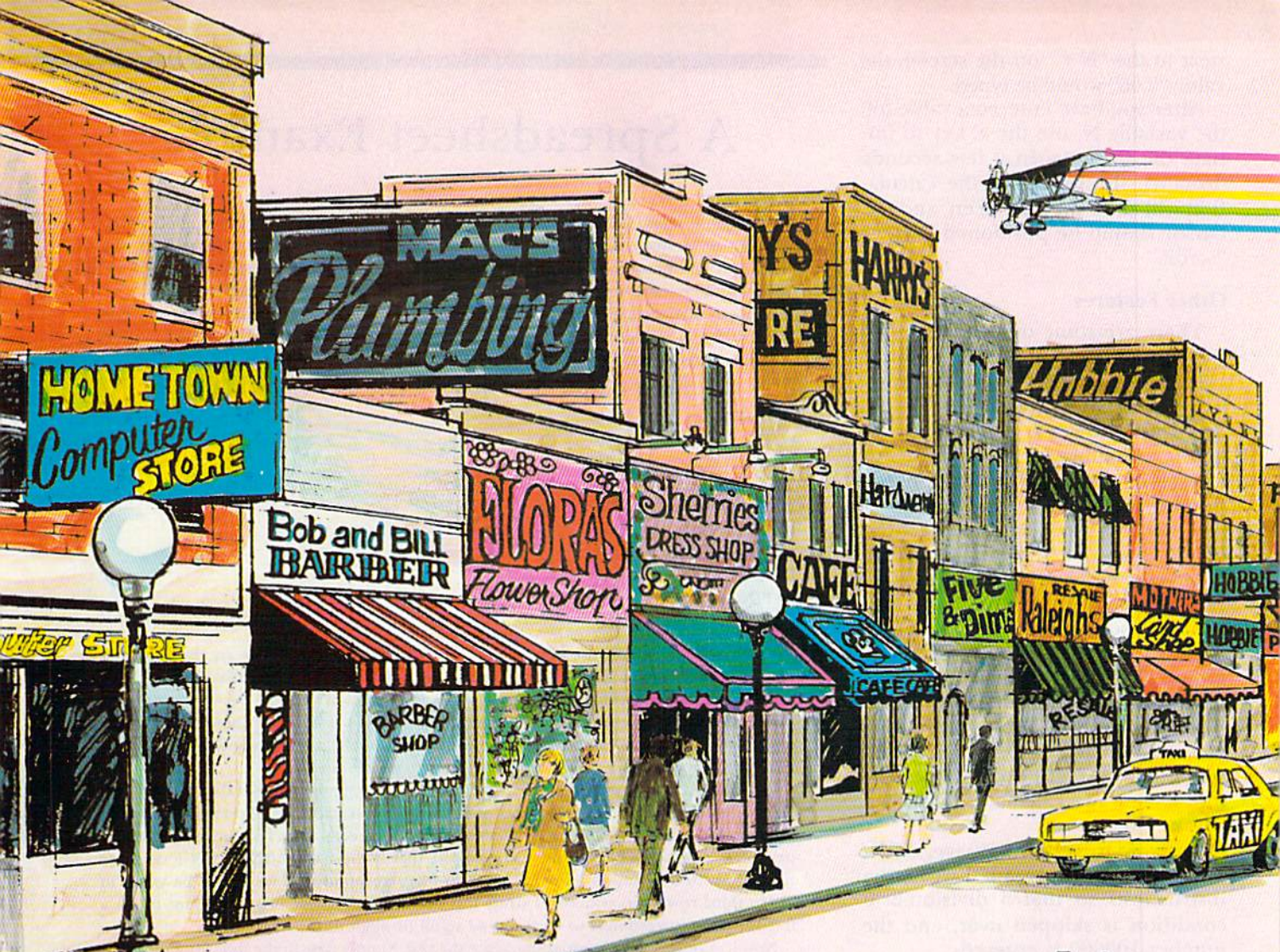
Step 4. Type any of the five operators: * / − + ,.

Step 5. Type any letter A through J or the letter N.

Steps 1, 2 and 3 will always be followed. In other words, you can't have a formula such as "B = ". Steps 4 and 5 can be repeated until the space provided fills up.

Therefore, you can have a formula as simple as "A = B" or as complicated as "A = B*C/H + N". The calculations are done in the order that they appear in the formula and *not* in the usual (*, /, +, −) order that some versions of Basic incorporate. Also, you may have noticed in step 4 an unusual operator—the comma. This character performs exponentiation and will be explained later.

After formula entry is complete, hit the ↑ key. The cursor will move down next to "N = ". The formula is entered but will not actually take effect until the variable N is entered. This is any number that you may want included in the formula; however, instead of typing something like "A = B*C + 2.06", you would type "A = B*C + N". Then, when the cursor drops down



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next to the "N=" on the screen, the value "2.06" would be typed.

After you have entered a value for the variable N, use the £ key to initiate the formula. In a few seconds (usually), the results of the calculation will show on the screen, and the cursor should be positioned back at "scroll."

Other Features

There are some other features of the spreadsheet I should mention.

First, I stated earlier that no number larger than 999999.99 can be entered. If, however, the program enters a number larger than this as a result of a formula calculation, the number entered would be 999999. If you see this after a formula entry, you'll know that the number calculated was too high to be displayed.

Another number, which you will probably see more often, is 100000. Again, the program will enter this after a formula calculation if a certain condition exists—division by 0. As you probably know, computers will not divide by 0. If a program tries this, you get an error message (the same way a calculator displays a row of Es).

To avoid this error message, which would stop the program, I wrote the instructions so that a division-by-0 condition is skipped over, and the number 100000 is entered.

The last feature is the Disk Save routine. When you have finished working with your spreadsheet and are ready to quit, press S. Type in your filename and press the return key. Your spreadsheet will be completely saved to disk and the program will end.

Additional Remarks

Now that I've covered just about everything you need to know to put the spreadsheet to work, I would like to add a few minor points.

If you realize you typed in a wrong number for N in your formula, there is a solution. If you hit the ↑ key, this will place the cursor back to the home position. Now you can type the right formula, hit the ↑ key and type another number for N.

Also, another editing feature to use is the £ key. After typing the formula, the ↑ key erases any remains of the "old" formula. Using the £ key instead does not erase anything. This is useful in changing just part of a formula.

If you want to advance through the columns, you can press the + key instead of the British pound sign. The difference is that hitting the + key will immediately move the cursor to the top of the next column. This feature is especially handy when, for example, you're changing a number in the first column and then moving on to the word "scroll." Here, all you do is hit the + key four times.

Technical Notes

Included with the program listing is a disassembly of the three machine language routines (see Listing 2) that control the vertical scroll and the number aligning within the windows. Also, there is a list of line-number ranges for each module of the program (see Table 2) and a chart that reviews which key to press when using the spreadsheet (see Table 3).

The machine language routines are probably the centerpiece of the whole program. Without them, I think that the ability to easily view any number within the matrix would have suffered. I won't go into the workings of these routines except to give a brief description.

The two scroll routines are almost identical. The only difference is that one works somewhat in a reverse

A Spreadsheet Example

I thought it might be helpful to briefly run through a typical spreadsheet application. You will no doubt come up with better spreadsheets than this, but it does show the usefulness of a program like this when calculating columns of numbers. Also, I will try to tie up some loose ends, especially the use of the comma (,) as an operator.

A money-management book I recently purchased included a table showing the possible effect different inflation rates could have on a typical household budget. I have created a similar table below, which will be used as our spreadsheet example.

	$ AMT PER YR.	% OF BUDGET	6% INFL.	10% INFL.	15% INFL.
HOUSING	3000				
FOOD	1800				
CLOTHING	1500				
TRANSPTN	850				
UTILITIES	800				
ENTERTNMT	800				
MED EX.	700				
HOUSE MAIN.	580				
SAVINGS	900				
MISC.	400				

You'll notice that only the first column is filled with numbers. These are the only ones that need to be typed. The other columns will be generated via formulas.

First, run the program. Next, type N after the question "LOAD DATA?," and then start entering the row and column names. It's probably best to enter these names in the same order as seen in the chart, but any order will work. Also, the program only accepts 7 (column) or 9 (row) letters in a name, so try to abbreviate.

When the screen is set up, enter that first column of numbers under the "$ AMT PER YR." column. Here is where the order of entering data is important. You may remember I stated earlier that any column of data corresponds directly to any other data according to screen position. This means, for example, that if the name "CLOTHING" is three rows down in the bottom left window, then its corresponding data should be typed in at the third row of its window. I stress this point only because it is important to get a feel for what corresponds to what as you scroll through different columns.

Now it is time to let the program create the rest. Simply type in the following formulas with their corresponding "N=" values in the same order as they are listed.

B=A/N	B=B*N	F=N	C=N,F*A	D=N,F*A	E=N,F*A
N=11330	N=100	N=20	N=1.06	N=1.10	N=1.15

The first and second formulas merely fill column B with a percentage breakdown of the various household expenses. This isn't particularly necessary for this example but may prove useful sometimes.

The third formula stores the number 20 into all of column F (this is a handy way of filling columns with a certain value).

Formulas 4, 5 and 6 are the real workhorses. They are responsible for storing columns C, D and E with the inflated values using percent rates of 6, 10 and 15, respectively. You'll notice that the value for "N=" changes for each rate.

The method for calculating columns C, D and E is based on the general compound-interest formula given below.

$FV = PV*(1+i)^N$

where:

FV = Future Value
PV = Present Value
i = Interest (or inflation) rate
N = Number of periods (or years)

As with any mathematical problem, the expression inside the parentheses is performed first. This is why the "N=" values in the example are set equal to 1.06, 1.10 and 1.15 (1 plus .6, .10 and .15 inflation rates). Next, these values have to be raised to the power of the number of periods (N), or 20 years (column F). Please note that this is accomplished by using the comma as an operator in the "N,F" part of the last three formulas. After this, you multiply by the "Present Values" that were typed into column A. (Thus, the complete formula—Result Column = N,F*A.)

For those of you who may be rusty on your math, another way to express "N,F" is N*N*N...20 times. Since it wouldn't be very convenient to have to type in something this long, you can see the reason for having an exponential operator. In other spreadsheet programs (and most versions of Basic), this operator is represented by the ↑ character. The coding scheme I used in this section of my program did not lend itself well to using this character, so I used the comma character instead.

The purpose of my example is mainly to show you that spreadsheets have many uses. These "what-if" guessing games seem to be most interesting.

As I stated elsewhere in this article, the operations in a formula are executed left to right (parentheses cannot be used). This was the reason for typing the formula as N,F*A instead of A*N,F. The latter would have multiplied column A by N and then raised this result to the power of column F (20).

This final result would not only be erroneous, but would produce numbers so high that the VIC would break out with an Overflow error message. Generally, such an error will only occur by misuse of the exponential operator (comma). A partial solution is available: simply clear the screen and type:

```
GOTO16000
```

When asked for the datafile name, type it in.

This will start saving your data to your disk. Afterwards, the program will end. As I said, this is only a partial solution. You will have to reload Mini-Calc and bring in the datafile you just saved.

manner from the other. In a scroll, you're either "pushing" everything in the windows up one space or down one space. You do this by loading the accumulator with information from a screen address, using a register (X or Y), then storing that information into the screen address directly above or below, using another register.

Both registers are then incremented or decremented (depending on what scroll you're using), and the next screen address is loaded into the accumulator, repeating the process. Of course, with each routine (up or down), this is taking place on all four windows almost at the same time.

The third machine language routine is responsible for aligning the numbers within the windows. I tried many other methods of doing this in Basic using string functions, and I found just one solution. This solution is used in printing the column totals but cannot be used with the other numbers because of speed requirements and other reasons.

This machine language routine aligns numbers simply by finding an offset. First, Basic prints the number at a position determined by which number in the spreadsheet is being changed (or entered). Then the machine language routine is called. This routine searches through the screen locations where the number has been printed, looking at each location and counting until it finds either a space (code 32) or a decimal (code 46). When either one is found, the number of its location is subtracted from 7. The result of this subtraction is then used to shift the number over that many locations.

For example, if the number was 35.8, then the decimal is found at the third location. Three subtracted from 7 is 4, which means that the number must be shifted over four screen positions. Seven is used because the decimal is to be lined up at the seventh position from where it was originally printed.

Row and column totals are automatically updated as you work with the spreadsheet.

One last technique that I think could be useful in any program is the Delete routine. It starts at line 800. Using the dynamic keyboard, it prints the line numbers that hold the Data statements and forces a carriage return over them (you can see this taking place right after typing RUN). This idea was harder to put into practice than I thought.

Originally, I had set the variable LN equal to the first line number to be deleted. After the first deletion, the program was to increment LN so that the next line could be deleted. It wouldn't work. It seemed that after the first line was deleted, all variables were reset to 0, including LN. Because of this, I changed the program so that LN would be incremented on the screen just as if it were being typed in Direct mode. This solved my problem.

Of course, these Data statements hold the machine language portion of the program and are Poked into the cassette buffer before deletion.

About *600* bytes of memory are saved using this technique.

Closing Remarks

I hope some of you can put this program to good use. When writing it, I came across many pitfalls, but I did learn a lot about Basic; notably, how it calculates and prints variables.

For those of you with 8K or 16K expanders, I have listed the line numbers that require changing. These contain screen addresses that probably only need subtracting an offset. In some cases, you will see two Pokes to locations 1 and 2. These numbers are a high-byte, low-byte address used by the machine language decimal alignment.

The number to be concerned with is the Poke to location 2. This will either be 30 or 31 and requires subtracting the offset. Also, look through the Data statements and change these two numbers (30 and 31) by taking off the offset.

Here are the line numbers to be changed: 110–123, 632–665, 703–730, 1030–1190 (Data statements), 4020, 4025, 6000, 6025, 6500, 6510, 6570, 6800, 7012, 9000–9015, 9061, 9062, 10015–10027.

If you have any questions or suggestions concerning the program, I would be happy to hear from you. I will also be glad to provide a copy of the program if you'll send me a self-addressed stamped mailer along with a disk or tape and $2. R

Address all author correspondence to Tim Adcock, 1308 Crain Highway, S.W., Glen Burnie, MD 21061.

Listing 1. *Disassembly of Mini-Calc program.*

```
033C  LDX #    57   87
033E  LDY #    6D   109
0340  LDA,X    1E6E 7790
0343  STA,Y    1E6E 7790
0346  LDA,X    1F08 7944
0349  STA,Y    1F08 7944
034C  LDA,X    1F8C 8076
034F  STA,Y    1F8C 8076
0352  DEY
0353  DEX
0354  CPX #    FF   255
0356  BNE      E8   0340
0358  LDA #    20   32
035A  STA,Y    1E6E 7790
035D  STA,Y    1F08 7944
0360  STA,Y    1F8C 8076
0363  DEY
0364  BNE      F4   035A
0366  LDA #    A0   160
0368  STA      1F95 8085
036B  RTS                    END OF ROUTINE
036C  LDY #    00   0
036E  LDX #    16   22
0370  LDA,X    1E6E 7790
0373  STA,Y    1E6E 7790
0376  LDA,X    1F08 7944
0379  STA,Y    1F08 7944
037C  LDA,X    1F8C 8076
037F  STA,Y    1F8C 8076
0382  INX
0383  INY
0384  CPY #    58   88
0386  BNE      E8   0370
0388  DEX
0389  LDA #    20   32
038B  STA,X    1E6E 7790
038E  STA,X    1F08 7944
0391  STA,X    1F8C 8076
0394  DEX
0395  CPX #    58   88
0397  BNE      F2   038B
0399  LDA #    A0   160
039B  STA      1FED 8173
039E  RTS                    END OF ROUTINE
039F  LDA #    07   7
03A1  CMP #    07   7
03A3  BEQ      02   03A7
03A5  LDA #    08   8
03A7  STA Z    C8   200
03A9  LDY #    00   0
03AB  INY
03AC  LDA[Y]   01   1
03AE  CMP #    20   32
03B0  BEQ      04   03B6
03B2  CMP #    2E   46
03B4  BNE      F5   03AB
0386  STY Z    00   0
03B8  LDA Z    C8   200
03BA  SEC
03BB  SBC Z    00   0
03BD  STA Z    00   0
03BF  CMP #    00   0
03C1  BEQ      16   03D9
03C3  LDY #    09   9
03C5  LDA[Y]   01   1
03C7  INY
03C8  STA[Y]   01   1
03CA  DEY
03CB  DEY
03CC  CPY #    FF   255
03CE  BNE      F5   03C5
03D0  INY
03D1  LDA #    20   32
03D3  STA[Y]   01   1
03D5  DEC Z    00   0
03D7  BNE      EA   03C3
03D9  LDA Z    02   2
03DB  CLC
03DC  ADC #    78   120
03DE  STA Z    02   2
03E0  LDY #    0A   10
03E2  LDA #    00   0
03E4  STA[Y]   01   1
03E6  DEY
03E7  BNE      FB   03E4
03E9  LDA Z    02   2
03EB  SEC
03EC  SBC #    78   120
03EE  STA Z    02   2
03F0  RTS                    END OF ROUTINE
```

Listing 2. *Mini-Calc program.*

```
10Ø PRINT"{SHFT CLR}":GOSUB1Ø1Ø:LN=1ØØØ:GOT
    O8ØØ
1Ø1 POKE36878,14:DIMA(1Ø,1Ø):PRINT"{SHFT CL
    R} LOAD DATA? HIT{CTRL 9}Y{CTRL Ø}OR{CT
    RL 9}N":K=197
1Ø2 GETD$:IFD$="" THEN1Ø2
1Ø3 IFD$="Y"THENGOSUB17ØØØ
1Ø5 CC=3Ø72Ø:H=1:S$="{5 CRSR DNs}":DEF FNB(
    X)=INT(X*1ØØ+.5):IFD$<>"Y"THENGOSUB12ØØ
    :PRINT"{SHFT CLR}"
11Ø FORT=768Ø+CCTO8185+CC:POKET,Ø:NEXT
```

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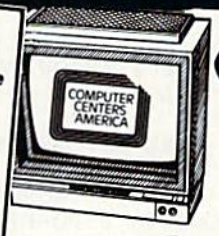

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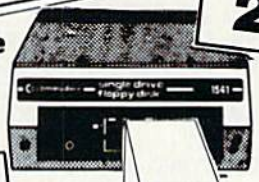

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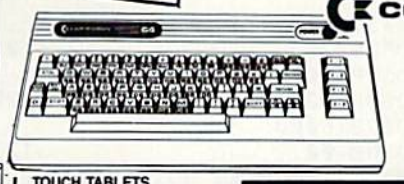

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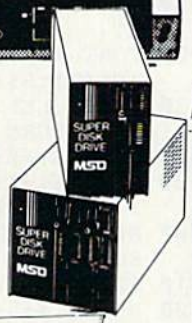

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Listing 2 continued.

```
115 FORT=768ØTO7789:POKET,16Ø:POKET+CC,3:NE
    XT
117 FORT=79ØØTO7943:POKET,16Ø:POKET+CC,3:NE
    XT
119 FORT=8Ø54TO8Ø75:POKET,16Ø:POKET+CC,3:NE
    XT
123 FORT=8Ø85TO8173STEP22:POKET,16Ø:POKET+C
    C,3:NEXT
14Ø X$="{1Ø SPACEs}":I=1
2ØØ PRINT"{HOME}{CTRL 7}{CTRL 9}A=A{1Ø SPAC
    Es}{CTRL 5}{CTRL 9}{LEFT ARROW}FORMULA"
    :PRINT"{CTRL 1}N={CTRL 7}{CTRL 9}{13 SP
    ACEs}{CTRL 5}SCROLL
21Ø PRINT"{6 CRSR RTs}{CTRL 9}{CTRL 6}MINI-
    CALC":PRINTTAB(1Ø)"{CTRL 9}{CTRL 5}{LEF
    T ARROW}DATA ENTRY{CTRL 1}":GOSUB1ØØ11
39Ø IFPEEK(K)=64THEN:POKE646,Ø:POKE7716+CC,
    Ø:GOTO39Ø
4ØØ H2=H+1:H3=H+2:H4=H+3:U$="":P$="":T$=""
42Ø IFPEEK(K)=32THENGOSUB62Ø
425 IFPEEK(K)=29THENGOSUB1ØØ1Ø
427 IFPEEK(K)=37THENGOSUB1ØØØØ
428 IFPEEK(K)=41THENGOSUB16ØØØ
43Ø IFPEEK(K)=21THENGOSUB7ØØ
435 IFPEEK(K)=54THENPOKE7716+CC,6: GOTO6ØØØ
44Ø IFPEEK(K)=6 THENPOKE7716+CC,6:GOSUB9ØØØ
    :GOSUB9ØØ5:GOSUB9Ø1Ø:GOSUB9Ø12
45Ø FORT=1TO2ØØ:NEXT:GOTO39Ø
62Ø J=I+5:PRINT"{HOME}{CTRL 2}"
63Ø IFJ>1ØTHEN69Ø
632 POKE1,198:POKE2,3Ø:SYS876
65Ø PRINT"{HOME}{CTRL 2}{9 CRSR DNs}";A(J,H
    )TAB(11)A(J,H2):SYS927:POKE1,2Ø9:SYS927
    :R$=STR$(A(J,Ø))
66Ø PRINT"{6 CRSR DNs}";A(J,H3)TAB(11)A(J,H
    4):POKE1,96:POKE2,31:SYS927:POKE1,1Ø7:S
    YS927
665 PRINT"{CTRL 1}{5 CRSR DNs}";A$(J)"{CTRL
     2}"TAB(1Ø)R$"{2 CRSR UPs}":POKE1,238:S
    YS933:J=J+1
68Ø IFPEEK(K)=32THEN63Ø
69Ø I=J-5:RETURN
7ØØ I=I-1:PRINT"{HOME}{CTRL 2}":IFI<1THENI=
    1:GOTO75Ø
7Ø3 POKE1,11Ø:POKE2,3Ø:SYS828
72Ø PRINT"{HOME}{CTRL 2}{5 CRSR DNs}";A(I,H
    )TAB(11)A(I,H2):SYS927:POKE1,121:SYS927
725 PRINT"{6 CRSR DNs}";A(I,H3)TAB(11)A(I,H
    4):POKE1,8:POKE2,31:SYS927:POKE1,19:SYS
    927
73Ø PRINT"{CTRL 1}{5 CRSR DNs}";A$(I)"{CTRL
     2}"TAB(1Ø)A(I,Ø):POKE1,15Ø:SYS933
74Ø IFPEEK(K)=21THEN7ØØ
75Ø RETURN
8ØØ IFLN>119ØTHEN1Ø1
8Ø5 PRINT"{HOME}"LN:PRINT"LN="LN"+1Ø:GOTO8Ø
    Ø"
81Ø POKE631,19:POKE632,13:POKE633,13:POKE19
    8,3:END
1Ø1Ø REM
1Ø2Ø FORT=828TO875 :READ D1:POKET,D1:NEXT
1Ø3Ø DATA 162,87,16Ø,1Ø9,189,11Ø,3Ø,153,11Ø
    ,3Ø,189,8,31
1Ø4Ø DATA 153,8,31,189,14Ø,31,153,14Ø,31,13
    6,2Ø2,224,255,2Ø8,232
1Ø5Ø DATA 169,32,153,11Ø,3Ø,153,8,31,153,14
    Ø,31,136,2Ø8,244
1Ø6Ø DATA 169,16Ø,141,149,31,96
1Ø7Ø REM SCROLL UP
1Ø8Ø FORT=876TO926:READ D2:POKET,D2:NEXT
1Ø9Ø DATA 16Ø, Ø,162,22 ,189,11Ø,3Ø,153,11Ø
    ,3Ø,189,8,31
11ØØ DATA 153,8,31,189,14Ø,31,153,14Ø,31,23
    2,2ØØ,192,88 ,2Ø8,232
111Ø DATA 2Ø2,169,32,157,11Ø,3Ø,157,8,31,15
    7,14Ø,31,2Ø2,224,88,2Ø8,242
112Ø DATA 169,16Ø,141,237,31,96
113Ø FORT=927TO1ØØ8:READ D3:POKET,D3:NEXT:R
    ETURN
114Ø DATA 169,7,2Ø1,7,24Ø,2,169,8,133,2ØØ
115Ø DATA16Ø,Ø,2ØØ,177,1,2Ø1,32,24Ø,4,2Ø1,4
    6,2Ø8,245
116Ø DATA 132,Ø,165,2ØØ,56,229,Ø,133,Ø,2Ø1,
    Ø,24Ø,22,16Ø,9
117Ø DATA177,1,2ØØ,145,1,136,136,192,255,2Ø
    8,245,2ØØ,169,32,145,1,198,Ø,2Ø8,234
118Ø DATA 165,2,24,1Ø5,12Ø,133,2,16Ø,1Ø,169
    ,Ø,145,1,136
119Ø DATA 2Ø8,251,165,2,56,233,12Ø,133,2,96
12ØØ PRINT"{SHFT CLR}":FORT=1TO1Ø:PRINT"TYP
    E ROW NAME"T:INPUTA$(T)
121Ø A$(T)=A$(T)+X$:A$(T)=LEFT$(A$(T),9):NE
    XT
122Ø FORT=1TO1Ø:PRINT"TYPE COL. NAME"T:INPU
    TB$(T):B$(T)=B$(T)+"{1Ø SPACEs}"
123Ø B$(T)=LEFT$(B$(T),7)+"="+CHR$(T+64):NE
    XT:RETURN
3ØØØ A(Ø,RS)=Ø:FORT=1TO1Ø
3Ø3Ø A(Ø,RS)=A(Ø,RS)+A(T,RS):NEXT:RC=RS-(H-
    1):IFRC<ØTHENRC=1Ø
4ØØØ SW=2:ON RC GOSUB9ØØØ,9ØØ5,9Ø1Ø,9Ø12:GO
    SUB9Ø15
4Ø1Ø FORT=ITOI+4:IFRC<1ORRC>4THEN4Ø23
4Ø2Ø PRINTT$;"{CRSR LF}{1Ø SPACEs}{1Ø CRSR
    LFs}"A(T,RS):POKE1,M2:POKE2,MH:SYS927
4Ø23 R$=STR$(A(T,Ø))
4Ø25 PRINTP$;TAB(1Ø)"{11 SPACEs}{11 CRSR LF
    s}"R$"{2 CRSR UPs}":POKE1,M:POKE2,31:S
    YS933
4Ø3Ø T$=T$+"{CRSR DN}":M2=M2+22:P$=P$+"{CRS
    R DN}":M=M+22:NEXT
4Ø4Ø SW=1:Q=RS:ON RC GOSUB9ØØØ,9ØØ5,9Ø1Ø,9Ø
    12:SW=Ø:GOTO39Ø
6ØØØ POKE198,Ø:SC=768Ø:PRINT"{HOME}";
6ØØ5 FORT=1TO1Ø:POKESC+CC,Ø
6Ø1Ø GETK$:IFK$=""THEN6Ø1Ø
6Ø2Ø IFK$="{LB.}"THENT=1Ø:GOTO65ØØ

6Ø25 IFK$="{UP ARROW}"ANDSC>7682THENFORG=SC
    TO7691:POKEG,16Ø:NEXT:T=1Ø:GOTO65ØØ
6Ø35 ONTGOTO6Ø4Ø,6Ø5Ø,6Ø6Ø,6Ø7Ø,6Ø6Ø,6Ø7Ø,6
    Ø6Ø,6Ø7Ø,6Ø6Ø,6Ø7Ø
6Ø4Ø IFK$<"A"ORK$>"J"THEN6Ø1Ø
6Ø42 GOTO6Ø9Ø
6Ø5Ø IFK$<>"="THEN6Ø1Ø
6Ø52 GOTO6Ø9Ø
6Ø6Ø IFK$<"A"ORK$>"J"ANDK$<>"N"THEN6Ø1Ø
6Ø64 GOTO6Ø9Ø
6Ø7Ø IFK$<>"/"ANDK$<>"*"ANDK$<>"+"ANDK$<>"-
    "ANDK$<>","THEN6Ø1Ø
6Ø9Ø PRINT"{CTRL 9}{CTRL 7}"K$;:SC=SC+1
65ØØ NEXT:POKESC+CC,6:L1=Ø:FORT=768ØTO769Ø:
    IFPEEK(T)=16ØTHENT=769Ø
65Ø5 L1=L1+1:NEXT:L1=INT((L1-4)/2)
651Ø PRINT"{HOME}{CRSR DN}{2 CRSR RTs}";:N$
    ="":SC=77Ø4:FORG=1TO7:POKE198,Ø:POKESC
    +CC,Ø
652Ø GETK$:IFK$=""THEN652Ø
653Ø IFK$="{LB.}"THENG=7:GOTO656Ø
6535 IFK$="{UP ARROW}"THENG=7:GOTO656Ø
654Ø IFK$<>"."ANDK$<>"-"ANDK$<"Ø"ORK$>"9"TH
    EN652Ø
655Ø PRINT"{CTRL 9}{CTRL 7}"K$;:N$=N$+K$:SC
    =SC+1
```

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Listing 2 continued.

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656Ø NEXT:PRINT"{CTRL 1}":POKESC+CC,6:IFN$=
     ""THEN68ØØ
657Ø NN=VAL(N$):FORG=SCTO7711:POKEG,16Ø:NEX
     T
68ØØ P2=7682:RS=PEEK(768Ø)-128:IFK$="{UP AR
     ROW}"THEN6ØØØ
683Ø FORT=1TO1Ø:OA=A(T,RS)
685Ø IF PEEK(P2)=142THENA(T,RS)=NN:GOTO7Ø12
69ØØ A(T,RS)=A(T,PEEK(P2)-128)
7Ø12 O=7683:P3=7684:IFPEEK(P3)=16ØTHEN7Ø9Ø
7Ø14 FORG=1TOL1
7Ø15 IFPEEK(P3)=142THENN1=NN:GOTO7Ø25
7Ø2Ø N1=A(T,PEEK(P3)-128)
7Ø25 O2=PEEK(O)-169
7Ø3Ø ON O2 GOTO 7Ø4Ø,7Ø45,7Ø5Ø,7Ø6Ø,7Ø6Ø,7Ø
     7Ø
7Ø4Ø A(T,RS)=A(T,RS)*N1:GOTO7Ø8Ø
7Ø45 A(T,RS)=A(T,RS)+N1:GOTO7Ø8Ø
7Ø5Ø A(T,RS)=A(T,RS){UP ARROW}N1:GOTO7Ø8Ø
7Ø6Ø A(T,RS)=A(T,RS)-N1:GOTO7Ø8Ø
7Ø7Ø IFN1=ØTHENA(T,RS)=1ØØØØ:G=L1:GOTO7Ø8Ø
7Ø75 A(T,RS)=A(T,RS)/N1
7Ø8Ø O=O+2:P3=P3+2:NEXT:IFA(T,RS)>999999.99
     THENA(T,RS)=999999
7Ø9Ø R=A(T,RS):A(T,RS)=FNB(R)
71ØØ A(T,RS)=A(T,RS)/1ØØ:A(T,Ø)=A(T,Ø)-OA+A
     (T,RS):R=A(T,Ø):A(T,Ø)=FNB(R)
71Ø5 A(T,Ø)=A(T,Ø)/1ØØ:NEXTT:GOTO3ØØØ
9ØØØ T$="{HOME}{5 CRSR DNs}{CRSR RT}":P=777
     7:N=779Ø:MH=3Ø:M2=11Ø:GOTO9Ø15
9ØØ5 T$="{HOME}{5 CRSR DNs}{12 CRSR RTs}":P
     =7788:N=78Ø1:MH=3Ø:M2=121:GOTO9Ø15
9Ø1Ø T$="{HOME}{12 CRSR DNs}{CRSR RT}":P=79
     31:N=7944:MH=31:M2=8:GOTO 9Ø15
9Ø12 T$="{HOME}{12 CRSR DNs}{12 CRSR RTs}":
     P=7942:N=7955:MH=31:M2=19
9Ø15 J=I:M=15Ø:P$="{HOME}{18 CRSR DNs}":U$=
     T$+S$:IFSW=1THEN9Ø63
9Ø17 IFSW=2THENRETURN
9Ø2Ø FORT=1TO5:POKE198,Ø:W$="":PRINT"{HOME}
     {3 CRSR DNs}{9 SPACEs}{9 CRSR LFs}";
9Ø25 POKEN,16Ø:POKEN+CC,Ø
9Ø27 IFPEEK(197)=6 THEN9Ø69
9Ø3Ø FORG=1TO9:POKE198,Ø
9Ø4Ø GETK$:IFK$=""THEN9Ø4Ø
9Ø42 IFG=7ANDK$<>"."THENG=9:GOTO9Ø53
9Ø44 IFK$="."THENG=7
9Ø45 IFK$="{LB.}"THENG=9:GOTO9Ø53
9Ø46 IFK$="+"THENG=9:T=5:GOTO9Ø53
9Ø47 IFK$<>"."ANDK$<>"-"ANDK$<"Ø"ORK$>"9"TH
     EN9Ø4Ø
9Ø48 W$=W$+K$:POKE36875,21Ø:POKE36875,Ø
9Ø5Ø PRINTK$;
9Ø53 NEXT G:IFW$=""ORK$="+"THEN9Ø69
9Ø56 Q=PEEK(P)-128:OA=A(J,Q):A(J,Q)=VAL(W$)
9Ø58 A(J,Ø)=A(J,Ø)-OA+A(J,Q)
9Ø59 A(Ø,Q)=A(Ø,Q)-OA+A(J,Q)
9Ø6Ø R=A(J,Ø):A(J,Ø)=FNB(R):A(J,Ø)=A(J,Ø)/1
     ØØ
9Ø61 PRINTT$;"{CRSR LF}{1Ø SPACEs}{1Ø CRSR
     LFs}"A(J,Q):POKE1,M2:POKE2,MH:SYS927:R
     $=STR$(A(J,Ø))
9Ø62 PRINTP$;TAB(1Ø)"{11 SPACEs}{11 CRSR LF
     s}"R$"{2 CRSR UPs}":POKE1,M:POKE2,31:S
     YS933
9Ø63 S=SGN(A(Ø,Q)):D=INT(ABS(A(Ø,Q)))*S:A1$
     =STR$(D):IFD=Ø AND S=-1THENA1$="-Ø"
9Ø65 R=A(Ø,Q):A(Ø,Q)=FNB(R):A2$=RIGHT$(STR$
     (A(Ø,Q)),2)
9Ø66 C$=LEFT$(A2$,1):IFC$=" "ORC$="-"THENA2
     $="Ø"+RIGHT$(A2$,1)
9Ø67 A1$=A1$+"."+A2$:A1$=X$+A1$:A1$=RIGHT$(
     A1$,1Ø)
9Ø68 A(Ø,Q)=A(Ø,Q)/1ØØ:PRINTU$"{CTRL 9}{CRS
     R LF}"A1$:IFSW=1THENQ=Q+1:RETURN
9Ø69 POKEN,32:N=N+22:T$=T$+"{CRSR DN}":J=J+
     1:P$=P$+"{CRSR DN}":M=M+22:M2=M2+22
9Ø7Ø NEXT T:RETURN
1ØØØØ H=H+1:IFH>7THENH=7:RETURN
1ØØ5 GOTO1ØØ11
1Ø01Ø H=H-1:IFH<1THENH=1:RETURN
1Ø011 PRINT"{HOME}{CTRL 7}{CTRL 9}{4 CRSR D
     Ns}{CRSR RT}"B$(H)TAB(12)B$(H+1)"{HOM
     E}{11 CRSR DNs}{CRSR RT}{CTRL 9}"B$(H
     +2)TAB(12)B$(H+3)
1Ø013 FORT=I+4TOISTEP-1:SYS828:POKE1,11Ø:PO
     KE2,3Ø
1Ø02Ø PRINT"{HOME}{5 CRSR DNs}";A(T,H)TAB(1
     1)A(T,H+1):SYS927:POKE1,121:SYS927
1Ø025 PRINT"{6 CRSR DNs}";A(T,H+2)TAB(11)A(
     T,H+3):POKE1,8:POKE2,31:SYS927:POKE1,
     19:SYS927
1Ø027 PRINT"{CTRL 1}{5 CRSR DNs}";A$(T)TAB(
     1Ø)A(T,Ø):POKE1,15Ø:SYS933:NEXT
11ØØØ SW=1:Q=H:GOSUB9ØØØ:GOSUB9ØØ5:GOSUB9Ø1
     Ø:GOSUB9Ø12:SW=Ø:RETURN
16ØØØ PRINT"{SHFT CLR}TYPE FILE NAME":INPUT
     F$:OPEN15,8,15,"I":OPEN2,8,2,"Ø:"+F$+
     ",S,W"
16ØØ5 FORT=1TO1Ø:PRINT#2,A$(T):PRINT#2,B$(T
     ):NEXT
16Ø1Ø FORT=ØTO1Ø:FORG=ØTO1Ø:PRINT#2,A(T,G):
     NEXT:NEXT:CLOSE2:CLOSE15:END
17ØØØ PRINT"ENTER FILE NAME":INPUTF$:OPEN15
     ,8,15,"I"
17ØØ5 OPEN2,8,2,"Ø:"+F$+",S,R":FORT=1TO1Ø:I
     NPUT#2,A$(T):INPUT#2,B$(T):NEXT
17Ø1Ø FORT=ØTO1Ø:FORG=ØTO1Ø:INPUT#2,A(T,G):
     NEXT:NEXT:CLOSE2:CLOSE15:RETURN
```


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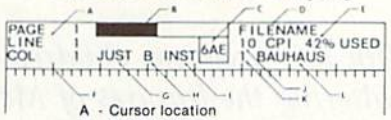

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D - Filename of text
E - Percentage of RAM (memory) used
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Mr. Computer Head

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By GEORGE DECKER

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Mr. Computer Head starts out as a featureless head on your screen. Beneath the head is a menu displaying five configurations each of mouth, eyes, ears, nose and hat. A pointer moves across the screen and pauses at each facial feature. When it is pointing to the feature you want, press the space bar. The pointer will then pause at each of the five variations of your chosen feature. When the pointer reaches your selection, press the space bar again. This feature then displays 15 colors, one at a time. When you reach a desired color, press the space bar.

Now the facial feature and its color will appear in the appropriate place on the head.

The pointer continues moving across the screen to the remaining headings, and you repeat the selection process to complete the face.

To bring Mr. Computer Head to life, press the f7 key. Each facial feature will wiggle in turn (Mr. Head will even stick out his tongue).

If you would like a copy of this program (tape only) without having to type it in, send me a self-addressed stamped envelope, a blank tape and $3. R

Address all author correspondence to George Decker, 251 N. Luzerne Ave., Baltimore, MD 21224.

Listing 1. *Mr. Computer Head program.*

```
10 POKE53280,1:POKE53281,1:PRINT"{SHFT CLR}
   "
20 FORA=55456TO56296:POKEA,0:NEXT
30 PRINT"{12 SPACEs}{CTRL 5}MR. COMPUTER HE
   AD"
40 PRINT"{11 CRSR DNs}{CTRL 6}{2 SPACEs}EYE
   S{4 SPACEs}NOSE{4 SPACEs}MOUTH{3 SPACEs}
   HAT{5 SPACEs}EARS"
50 SC=1184:FORA=1TO24:READB:READC:POKEB+SC,
   C:NEXT:POKE55715,2
60 DATA16,78,17,99,18,99,19,99,20,99,21,99,
   22,77
70 DATA56,101,62,103,96,101,102,103,136,101
   ,142,103,176,101,182,103
80 DATA216,101,222,103,256,77,262,78,297,99
   ,298,99,299,99,300,99,301,99
100 SC=1624:FORA=1TO55:READB:READC:POKEB+SC
   ,C:NEXT
110 DATA2,81,4,81,10,65,18,95,19,160,20,105
   ,26,98,27,160,28,98,34,36,36,36
120 DATA82,90,84,90,90,81,98,127,99,121,100
   ,255,106,233,107,160,108,223,114
130 DATA81,116,81,162,236,164,236,170,88,17
   8,77,179,100,180,78,186,233,187
140 DATA233,188,233,194,90,196,90,242,87,24
   4,87,250,90,258,32,259,81,260,32
150 DATA266,104,267,102,268,104,274,107,276
   ,115,322,252,324,252,330,83,338
155 DATA111,339,111,340,111,346,108,347,160
   ,348,123,354,95,356,105
160 WA=0:FORPO=1545TO1578STEP8:POKEPO,62:WA
   =WA+1:POKE54283,0
162 REM SCREEN SET UP
163 REM****************
165 POKE54296,15:POKE54280,34:POKE54279,75:
   POKE54284,64:POKE54285,16
170 POKE198,0:FORZ=1TO200:GETA$:IFA$=" "THE
   N200
175 IFA$="{FUNCT 7}"THENPOKEPO,32:GOTO360
180 NEXTZ:POKE54283,33:POKEPO,32:NEXTPO:GOT
   O160
185 REM MOVE POINTER ACROSS SCREEN
190 REM*******************************
200 POKEPO,32:Q=PO+400
210 FORDO=PO+80TOQSTEP80:POKEDO,62
220 POKE54283,0:POKE198,0:FORE=1TO200:GETA$
   :IFA$=" "THEN250
```

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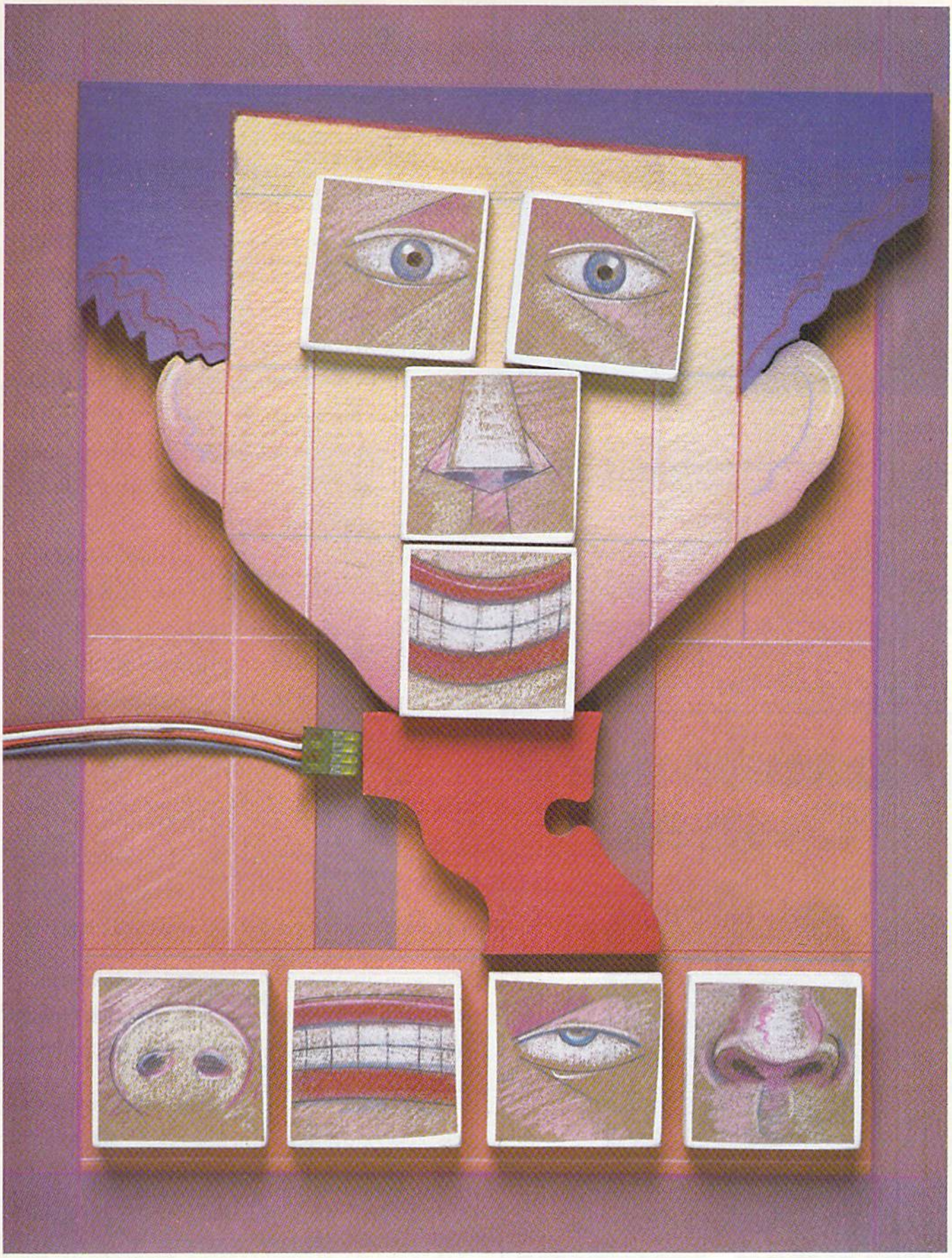

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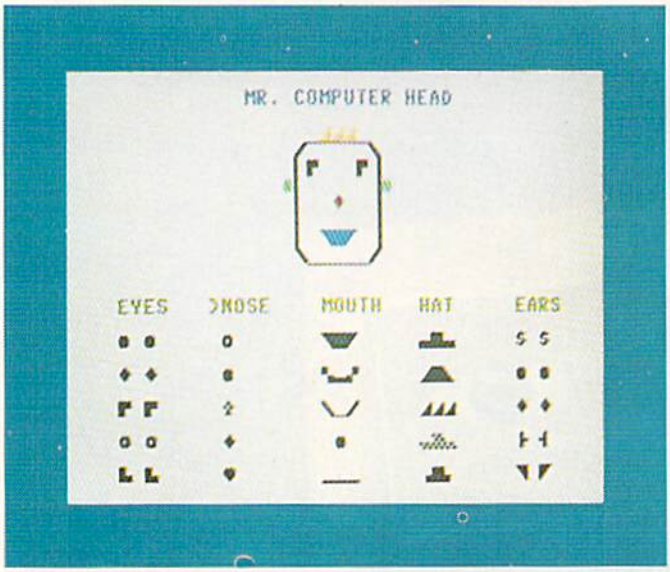

Listing 1 continued.

```
23Ø  IFA$="{FUNCT 7}"THENPOKEDO,32:GOTO36Ø
24Ø  NEXTE:POKEDO,32:POKE54283,33:NEXTDO:GOT
     O21Ø
245  REM*************************
25Ø  CO=DO+54273
26Ø  FORR=ØTO15:POKECO,R:POKECO+1,R:POKECO+2
     ,R:POKE54283,Ø
27Ø  POKE198,Ø:FORF=1TO2ØØ:GETA$:IFA$=" "THE
     N3ØØ
28Ø  NEXTF:POKE54296,15:POKE54277,128:POKE54
     278,Ø:POKE54273,25:POKE54272,177
285  IFR=ØTHENR=1
29Ø  POKE54283,33:NEXTR:GOTO26Ø
295  REM CHANGE COLORS
296  REM*****************
3ØØ  IFWA=1THENPOKE1241,PEEK(DO+1):POKE1245,
     PEEK(DO+3)
3Ø5  IFWA=1THENPOKE55513,R:POKE55517,R
31Ø  IFWA=2THENPOKE1323,PEEK(DO+1):POKE55595
     ,R:POKE55555,R
32Ø  IFWA=3THENPOKE14Ø2,PEEK(DO+1):POKE14Ø3,
     PEEK(DO+2):POKE14Ø4,PEEK(DO+3)
325  IFWA=3THENPOKE55674,R:POKE55675,R:POKE5
     5676,R
33Ø  IFWA=4THENPOKE1162,PEEK(DO+1):POKE1163,
     PEEK(DO+2):POKE1164,PEEK(DO+3)
335  IFWA=4THENPOKE55434,R:POKE55435,R:POKE5
     5436,R
34Ø  IFWA=5THENPOKE1279,PEEK(DO+1):POKE1287,
     PEEK(DO+3)
345  IFWA=5THENPOKE55551,R:POKE55559,R:POKE5
     5511,R:POKE55519,R
35Ø  POKEDO,32:POKECO,O:POKECO+1,Ø:POKECO+2,
     Ø:GOTO16Ø
355  REM PLACE PARTS OF FACE & COLORS
356  REM*******************************
36Ø  E1=PEEK(1241):E2=PEEK(1245):ER1=PEEK(12
     79):EZ2=PEEK(1287)
37Ø  N1=PEEK(1323):M1=PEEK(14Ø2):M2=PEEK(14Ø
     3):M3=PEEK(14Ø4)
375  REM STORE FACE PARTS
376  REM********************
38Ø  POKE54296,15:V1=54273:V2=54272:POKEV1,3
     4:POKEV2,75:POKE54276,Ø
4ØØ  FORX=1TO1Ø:POKE1241,67:POKE1245,67:POKE
     54276,17
41Ø  FORU=1TO75:NEXTU:POKE1241,E1:POKE1245,E
     2:POKE54276,Ø
415  FORU=1TO75:NEXTU:NEXTX:FORS=1TO2ØØ:NEXT
     S
42Ø  FORX=1TO1Ø:POKE1323,32:POKE1283,N1:POKE
     54276,17:POKEV1,43:POKEV2,42
43Ø  FORU=1TO75:NEXTU:POKE1323,N1:POKE1283,3
     2:POKE54276,Ø:POKE54276,Ø
435  FORU=1TO75:NEXTU:NEXTX:FORS=1TO2ØØ:NEXT
     S
44Ø  FORX=1TO1Ø:POKE1279,32:POKE1239,ER1:POK
     E1287,32:POKE1247,EZ2:POKE54276,17
445  POKEV1,57:POKEV2,172
45Ø  FORU=1TO75:NEXTU:POKE1279,ER1:POKE1239,
     32:POKE1287,EZ2:POKE1247,32
455  POKE54276,Ø:FORU=1TO75:NEXTU:NEXTX:FORS
     =1TO2ØØ:NEXTS
46Ø  FORX=1TO1Ø:POKE14Ø2,77:POKE14Ø3,1ØØ:POK
     E14Ø4,78:POKE54276,17
465  :POKEV1,36:POKEV2,169
47Ø  FORU=1TO75:NEXTU:POKE14Ø2,M1:POKE14Ø3,M
     2:POKE14Ø4,M3:POKE54276,Ø
475  FORU=1TO75:NEXTU:NEXTX:FORS=1TO2ØØ:NEXT
     S
48Ø  FORX=1TO1Ø:POKE14Ø2,78:POKE14Ø3,99:POKE
     14Ø4,77:POKE54276,33
485  POKEV1,4Ø:POKEV2,2ØØ
49Ø  FORU=1TO75:NEXTU:POKE14Ø2,M1:POKE14Ø3,M
     2:POKE14Ø4,M3:POKE54276,Ø
495  FORU=1TO75:NEXTU:NEXTX:FORS=1TO2ØØ:NEXT
     S
5ØØ  POKE14Ø2,1ØØ:POKE14Ø3,1ØØ:POKE14Ø4,1ØØ
51Ø  FORX=1TO5:POKE1443,16Ø:POKE54276,129
52Ø  FORU=1TO3ØØ:NEXTU:POKE1443,32:POKE54276
     ,Ø
525  FORU=1TO15Ø:NEXTU:NEXTX
53Ø  POKE14Ø2,M1:POKE14Ø3,M2:POKE14Ø4,M3:GOT
     O16Ø
54Ø  REM MOVEMENT OF FACE
541  REM ********************
```

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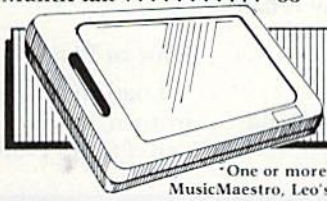

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MAKING FACES

By RICH BEACHLER

Like many other Commodore owners, I moved up to the Commodore 64 after starting out with a VIC-20. When I did so, I turned my VIC-20 over to my four-year-old daughter, Aleda.

While there is a wealth of commercial educational software available for the Commodore 64, there is a real dearth of VIC-20 programs, especially those aimed at preschool aged children. Almost all of my daughter's programs come from magazines such as *RUN*.

To add to this scant supply of VIC-20 software for preschoolers, I decided to write an interactive, noncompetitive, nonsexist game that would make use of the VIC's custom graphics capability. The result is Faces, and I am pleased to say it has become Aleda's present favorite.

Entering Faces

Faces is in two parts. Type in the first part and, before running it, save it with the name "Faces Loader." If you don't first save this program, it erases itself, after running, to make way for part two.

If you are using disk, make the following change to Faces Loader:

```
200 PRINT"{CLR}{2 DN}LOAD"CHR$(34)
    "FACES"CHR$(34)",8";
```

Type NEW and type in the second part. Save it with the name "Faces." If you are using tape, Faces should be saved immediately following Faces Loader.

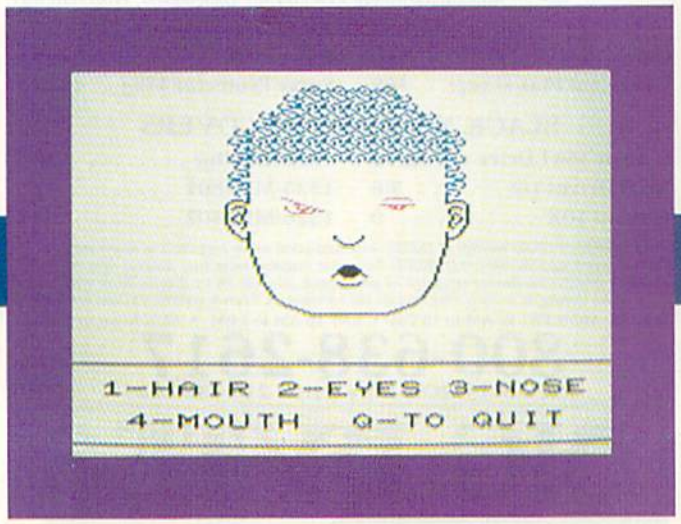
Please note that Faces uses all the available memory in an unexpanded VIC-20. Do not type in any spaces except for those inside quotes! Also, it will only run on an unexpanded VIC-20, so remove or disable any memory expansion.

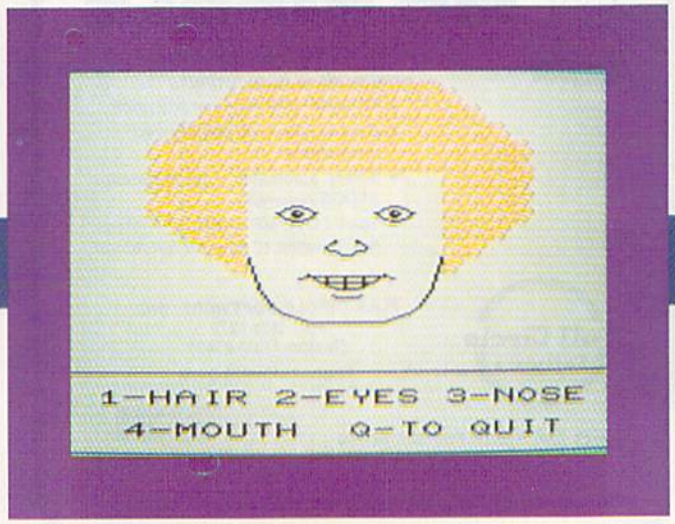
How to Play

Load and run Faces Loader, which, in turn, will automatically load and run Faces. I added some flashing words and scrolling colors to the character-loading section of the program. That way, your child can enjoy watching something happen while data is being loaded, rather than staring at a "Please Wait" message.

Soon, a face with a small menu below it will appear, and a very short melody will play. To change any of the facial features listed in the menu, you need only press the appropriate number key. When a choice has been made, a new menu will appear.

If you choose to change the hair, the menu will ask for a choice of style 1 or 2. (The style you see when the program begins is style 1.) After a style has been chosen, the menu will ask for a choice of hair color. To make a selection, you must press the number key corresponding to the number in the desired color. The face will be redrawn with the new hair style and color. The original menu will reappear, and the short tune will play again.





RUN It Right

Unexpanded VIC-20

Let's face it, there aren't that many unexpanded VIC-20 programs for preschoolers. Here's one that is not only easy to handle, but also provides your child with hours of pleasurable and creative activity.

If you choose to change any other facial features in the menu, the new menu will instruct you to press the space bar to change, whereupon the change in the chosen feature happens immediately. Continuously pressing the space bar causes the feature to keep changing. When you are satisfied with the choice, press the return key to bring back the original menu.

All the choices have helped my daughter learn to recognize the names of the features and the correct keys to press. She also has found some favorite program features of her own (such as holding down the space bar when changing the eye color, causing the eyes to blink).

If the player chooses the Quit option, all the correct memory pointers are restored, and typing NEW prepares the VIC for any new program.

How It Works

I have redefined the first 64 characters in the character set. (And I use all 64 of them!) They are stored in locations 7168 to 7679. Poking location 36869 with the value 255 tells the VIC to look for its 2048-byte character set, starting at location 7168. This causes the unexpanded VIC's character set to wrap around into read only memory (ROM). The VIC then sees normal (nonreversed) characters where it would normally see reversed characters. It is then possible to print a message with normal characters by using the CTRL and RVS-on keys.

The hair and the outline of the face are drawn using Print statements. The letters in the Print statements have all been redefined and appear as parts of the face.

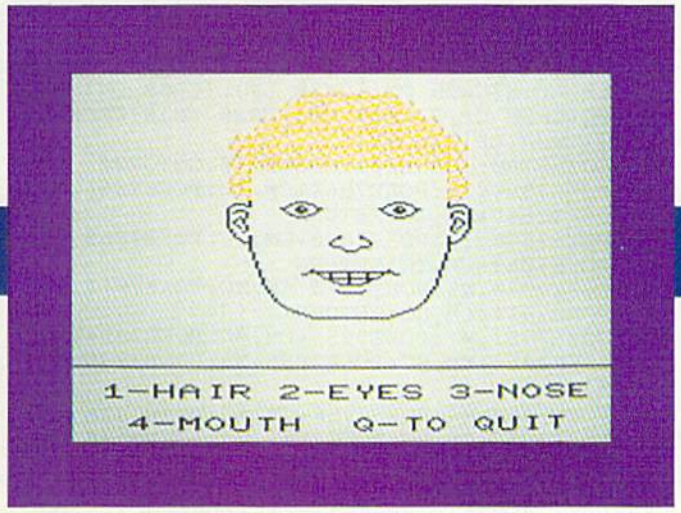
The rest of the facial features are poked to the screen. This allows their immediate change without redrawing the entire face. The eyes and nose use two custom characters each. The mouth uses six characters.

Since there was no room for REM statements in the main program of the VIC-20 version, I will give you a brief program outline.

Lines 10–40. Set variables and strings
Lines 100–240. Draw face and hair
Lines 250–295. Print main menu
Lines 300–350. Change hair
Lines 400–495. Change eyes
Lines 500–540. Change nose
Lines 600–680. Change mouth
Lines 700–770. Sound subroutines
Lines 800–830. Input subroutine
Line 900. Erases menu subroutine

I hope you (and any young friends of yours) find this program enjoyable! If you want to save the trouble of typing it in, send me a stamped, self-addressed envelope, a blank tape and $3, and I'll make you a copy. R

Address all author correspondence to Rich Beachler, RR #2, Boone, IA 50036.



Listing 1. *Faces Loader program.*

```
1Ø POKE52,28:POKE56,28:CLR
2Ø POKE36879,25:LOC=7863:CM=3Ø72Ø:CN=1:CH=7
   168
3Ø PRINT"{SHFT CLR}";:PRINTTAB(7)"{8 CRSR D
   Ns}{CTRL 9}{CTRL 1} FACES "
4Ø FORI=CHTOCH+511:POKEI,PEEK(256ØØ+I):N=N+
   1
5Ø IFN=8ØTHENN=Ø:CN=CN+1:FORA=LOC+CMTOLOC+C
   M+6:POKEA,CN:NEXTA
6Ø NEXTI
7Ø PRINT"{SHFT CLR}";:PRINTTAB(6)"{7 CRSR D
   Ns}{CTRL 9}{CTRL 1}{9 SPACEs}"
75 PRINTTAB(6)"{CTRL 9}{2 SPACEs}{CTRL 3}F{
   CTRL 4}A{CTRL 5}C{CTRL 6}E{CTRL 7}S{CTRL
    8} {CTRL 1} "
8Ø PRINTTAB(6)"{CTRL 9}{9 SPACEs}"
85 PRINTTAB(4)"{3 CRSR DNs}{CTRL 3}GETTING
   READY!"
9Ø N=Ø:CN=7
1ØØ READA:IFA=-1THEN2ØØ
11Ø POKECH,A:CH=CH+1:N=N+1:IFN<>1ØTHEN1ØØ
12Ø N=Ø:FORI=LOC+CM+6TOLOC+CMSTEP-1:POKEI,C
   N:CN=CN+1
14Ø IFCN>7THENCN=2
15Ø NEXT:GOTO1ØØ
2ØØ PRINT"{SHFT CLR}{2 CRSR DNs}LOAD";
21Ø POKE198,7:POKE631,145:POKE632,145:POKE6
   33,13
22Ø POKE634,82:POKE635,85:POKE636,78:POKE63
   7,13:NEW
3ØØ DATAØ,Ø,Ø,Ø,Ø,Ø,Ø,Ø
3Ø1 DATA9,19,17,14,33,77,71,56
3Ø2 DATA144,2ØØ,136,112,132,178,226,28
3Ø3 DATA38,81,137,7Ø,152,165,149,82
3Ø4 DATAØ,Ø,Ø,Ø,12,82,181,73
3Ø5 DATA56,71,77,33,14,17,19,9
3Ø6 DATA28,226,178,132,112,136,2ØØ,144
3Ø7 DATA1,61,67,128,156,162,13Ø,138
3Ø8 DATA148,164,164,146,138,66,68,32
3Ø9 DATA33,17,9,7,1,1,1,1
31Ø DATA128,128,128,128,64,64,64,64
311 DATA32,32,32,32,16,16,16,16
312 DATA8,8,4,4,2,2,1,1
313 DATA128,64,32,24,6,1,Ø,Ø
314 DATAØ,Ø,Ø,Ø,Ø,128,96,31
315 DATAØ,Ø,Ø,Ø,Ø,Ø,Ø,255
316 DATAØ,Ø,Ø,Ø,Ø,1,6,248
317 DATA1,2,4,24,96,128,Ø,Ø
318 DATA16,16,32,32,64,64,128,128
319 DATA4,4,4,4,8,8,8,8
32Ø DATA1,1,1,1,2,2,2,2
321 DATA132,136,144,224,128,128,128,128
322 DATA41,37,37,73,81,66,34,4
323 DATA128,188,194,1,57,69,65,81
324 DATA3,12,17,99,35,17,12,3
325 DATA192,48,136,7Ø,196,136,48,192
326 DATA15,16,Ø,63,7,3,Ø,Ø
327 DATA24Ø,8,Ø,252,96,192,Ø,Ø
328 DATAØ,Ø,Ø,96,16,44,11,2
329 DATAØ,Ø,Ø,6,8,52,2Ø8,64
33Ø DATA48,12,3,3,17,17,8,7
331 DATAØ,Ø,Ø,192,48,236,2Ø3,24Ø
332 DATAØ,Ø,Ø,3,12,55,211,15
333 DATA12,48,192,192,136,136,16,224
334 DATA7,8,16,35,1Ø2,167,31,7
335 DATA224,16,8,196,1Ø2,229,248,224
336 DATA8,24,32,64,64,56,4,3
337 DATA16,24,4,2,2,28,32,192
338 DATAØ,Ø,16,16,8,4,3,Ø
339 DATAØ,Ø,8,8,16,32,192,Ø
34Ø DATA52,72,128,128,224,16,12,3
341 DATA44,18,1,1,7,8,48,192
342 DATA2,36,64,128,136,156,76,34
343 DATA64,36,2,1,17,57,5Ø,68
344 DATA16,63,196,2,1,Ø,Ø,Ø
345 DATAØ,255,65,65,255,65,49,15
346 DATAØ,255,4,4,255,6,12,24Ø
347 DATA8,252,35,64,128,Ø,Ø,Ø
348 DATAØ,Ø,16,15,Ø,Ø,Ø,Ø
349 DATAØ,Ø,8,24Ø,Ø,Ø,Ø,Ø
35Ø DATAØ,Ø,5,3,Ø,Ø,Ø,Ø
351 DATA62,193,Ø,254,129,64,32,24
352 DATA124,131,Ø,127,129,2,4,24
353 DATAØ,Ø,16Ø,192,Ø,Ø,Ø,Ø
354 DATA7,Ø,Ø,Ø,Ø,Ø,Ø,Ø
355 DATA224,Ø,Ø,Ø,Ø,Ø,Ø,Ø
356 DATAØ,Ø,Ø,Ø,Ø,2,1,Ø
357 DATAØ,14,17,32,64,135,8,128
358 DATAØ,112,136,4,2,225,16,1
359 DATAØ,Ø,Ø,Ø,Ø,64,128,Ø
36Ø DATA3,7,15,15,23,35,Ø,Ø
361 DATA192,224,24Ø,24Ø,232,196,Ø,Ø
362 DATA8,7,Ø,Ø,Ø,Ø,Ø,Ø
363 DATA16,224,Ø,Ø,Ø,Ø,Ø,Ø,-1
```

Listing 2. *Main Faces program.*

```
1Ø POKE36869,255:CM=3Ø72Ø:I1=24:I2=25:I3=I1
   :I4=I2:MF=Ø:MN=1:N1=36:N2=37:M1=44:M2=45
2Ø M3=46:M4=47:M5=48:M6=49:D$="{HOME}{19 CR
   SR DNs}":HC=7:HA=1
3Ø P$="{CRSR UP}{CTRL 3}{CTRL 9} PRESS'SPAC
   E'TO CHANGE {CTRL 7}PRESS'RETURN'TO KEEP
   {CTRL Ø}"
4Ø V=36878:S2=36875:S3=36876:DIMMU(3)
1ØØ PRINT"{SHFT CLR}";:POKE646,HC:IFHA=1THE
   N16Ø
11Ø PRINTTAB(7)"DDDDDDDD":PRINTTAB(6)"ACCCC
   CCCCB":PRINTTAB(5)"ACCCCCCCCCCB"
12Ø PRINTTAB(4)"ACCCCCCCCCCCCB":FORI=1TO2:P
   RINT"{3 CRSR RTs}ACCCCCCCCCCCCCCB":NEXT
13Ø FORI=1TO2:PRINT"{3 CRSR RTs}ACCC"SPC(8)
   "CCCF":NEXT
14Ø PRINT"{3 CRSR RTs}ECCC"SPC(8)"CCCF":PRI
   NTTAB(4)"ECC"SPC(8)"CCF":PRINTTAB(5)"EC
   "SPC(8)"CF"
15Ø PRINTTAB(6)"E"SPC(8)"F{CRSR UP}";:GOTO1
   8Ø
16Ø PRINTTAB(9)"{CRSR DN}DDDD":PRINTTAB(8)"
   ACCCCB":PRINTTAB(7)"ACCCCCCB"
165 FORI=1TO2:PRINTTAB(6)"ACCCCCCCCB":NEXT
17Ø PRINTTAB(6)"A{CRSR DN}{CRSR LF}E"SPC(8)
   "F{CRSR UP}{CRSR LF}B":PRINT:PRINTTAB(6
   )"{CTRL 1}G{CRSR DN}{CRSR LF}H{CRSR DN}
   {CRSR LF}I"SPC(8)"U{CRSR UP}{CRSR LF}V{
   CRSR UP}{CRSR LF}W":PRINT
18Ø PRINT:PRINTTAB(7)"{CTRL 1}J{CRSR DN}{CR
   SR LF}K{CRSR DN}{CRSR LF}L{CRSR DN}MNOO
   PQ{CRSR UP}R{CRSR UP}{CRSR LF}S{CRSR UP
   }{CRSR LF}T{HOME}";
185 GOSUB19Ø:GOSUB2ØØ:GOSUB21Ø:GOTO22Ø
19Ø POKE7864,I1:POKE7864+CM,IC:POKE7865,I2:
   POKE7865+CM,IC:RETURN
2ØØ POKE7868,I3:POKE7868+CM,IC:POKE7869,I4:
   POKE7869+CM,IC:RETURN
21Ø POKE791Ø,N1:POKE791Ø+CM,NC:POKE7911,N2:
   POKE7911+CM,NC:RETURN
22Ø POKE7953,M1:POKE7953+CM,MC:POKE7954,M2:
   POKE7954+CM,MC:POKE7955,M3:POKE7955+CM,
   MC
23Ø POKE7956,M4:POKE7956+CM,MC:POKE7976,M5:
   POKE7976+CM,MC:POKE7977,M6:POKE7977+CM,
   MC
24Ø IFMF=1THENMF=Ø:GOTO61Ø
25Ø FORI=ØTO21:POKE8Ø54+I,15:POKE8Ø54+I+CM,
```

Listing 2 continued.

```
    Ø:POKE8164+I,15:POKE8164+CM+I,Ø:NEXT
26Ø GOSUB9ØØ:PRINT"{CTRL 9}{CTRL 1} 1-HAIR
    2-EYES 3-NOSE":PRINT"{CRSR UP}{CTRL 9}{
    2 SPACEs}4-MOUTH{2 SPACEs}Q-TO QUIT":GO
    TO7ØØ
27Ø GOSUB8ØØ:IFC<1ORC>4THEN27Ø
28Ø ONCGOTO3ØØ,4ØØ,5ØØ,6ØØ
29Ø IFH1=1THENH1=Ø:GOTO1ØØ
295 GOTO26Ø
3ØØ GOSUB9ØØ:PRINTTAB(9)"{CTRL 9}{CTRL 1}HA
    IR{CRSR DN}":PRINTTAB(5)"{CRSR UP}{CTRL
     9}{CTRL 3}STYLE 1 OR 2?"
31Ø GOSUB8ØØ:IFC<1ANDC>2THEN31Ø
315 HA=1:IFC=2THENHA=Ø:GOSUB75Ø
32Ø GOSUB9ØØ:PRINTTAB(6)"{CTRL 9}{CTRL 1}HA
    IR COLOR?{CRSR DN}":PRINTTAB(8)"{CRSR U
    P}{CTRL 9}1{CTRL 3}3{CTRL 4}4{CTRL 5}5{
    CTRL 6}6{CTRL 7}7{CTRL 8}8"
33Ø GOSUB8ØØ:H1=1:IFC<1ORC>8THEN33Ø
34Ø HC=C-1:IFHC=1THENHC=Ø
35Ø GOTO29Ø
4ØØ GOSUB9ØØ:PRINTTAB(7)"{CTRL 9}{CTRL 1}LE
    FT EYE{CTRL Ø}":PRINT"{CRSR UP}"P$
4Ø5 GOSUB8ØØ:IFC$=CHR$(13)THEN435
41Ø IFC$=CHR$(32)THENI1=I1+2:I2=I2+2:GOSUB7
    5Ø
42Ø IFI1=32THENI1=I1+2:I2=I2+2
425 IFI1>34THENI1=24:I2=25
43Ø GOSUB19Ø:GOTO4Ø5
435 GOSUB9ØØ:PRINTTAB(6)"{CTRL 9}{CTRL 1}RI
    GHT EYE":PRINT"{CRSR UP}"P$
44Ø GOSUB8ØØ:IFC$=CHR$(13)THENGOTO475
45Ø IFC$=CHR$(32)THENI3=I3+2:I4=I4+2:GOSUB7
    5Ø
46Ø IFI3=3ØTHENI3=I3+2:I4=I4+2
465 IFI3>34THENI3=24:I4=25
47Ø GOSUB2ØØ:GOTO44Ø
475 GOSUB9ØØ:PRINTTAB(7)"{CTRL 9}{CTRL 1}EY
    E COLOR":PRINT"{CRSR UP}"P$
48Ø GOSUB8ØØ:IFC$=CHR$(13)THENGOTO29Ø
485 IFC$=CHR$(32)THENIC=IC+1:IFIC>6THENIC=Ø
49Ø IFIC=1THENIC=2
495 POKE7864+CM,IC:POKE7865+CM,IC:POKE7868+
    CM,IC:POKE7869+CM,IC:GOTO48Ø
5ØØ GOSUB9ØØ:PRINTTAB(9)"{CTRL 9}{CTRL 1}NO
    SE":PRINT"{CRSR UP}"P$
51Ø GOSUB8ØØ:IFC$=CHR$(13)THENGOTO29Ø
52Ø IFC$=CHR$(32)THENN1=N1+2:N2=N2+2:GOSUB7
    5Ø
53Ø IFN1>42THENN1=36:N2=37
54Ø GOSUB21Ø:GOTO51Ø
6ØØ GOSUB9ØØ:PRINTTAB(8)"{CTRL 9}{CTRL 1}MO
    UTH":PRINT"{CRSR UP}"P$
61Ø GOSUB8ØØ:IFC$=CHR$(13)THENGOTO29Ø
62Ø IFC$=CHR$(32)THENMN=MN+1:GOSUB75Ø
63Ø IFMN>4THENMN=1
64Ø MF=1:IFMN=1THENM1=44:M2=45:M3=46:M4=47:
    M5=48:M6=49:MC=Ø:GOTO22Ø
65Ø IFMN=2THENM1=5Ø:M2=51:M3=52:M4=53:M5=54
    :M6=55:MC=2:GOTO22Ø
66Ø IFMN=3THENM1=56:M2=57:M3=58:M4=59:M5=Ø:
    M6=Ø:MC=Ø:GOTO22Ø
67Ø IFMN=4THENM1=Ø:M2=6Ø:M3=61:M4=Ø:M5=62:M
    6=63:MC=Ø:GOTO22Ø
68Ø GOTO61Ø
7ØØ RESTORE
71Ø FORI=1TO5:POKEV,13:READMU(Ø),D1,D2
72Ø POKES2,MU(Ø):FORA=1TOD1:NEXT:POKES2,Ø:F
    ORA=1TOD2:NEXTA,I
73Ø FORI=1TO2:READMU(Ø),MU(1),D1,D2
735 POKES2,MU(Ø):POKES3,MU(1):FORA=1TOD1:NE
    XT:POKES2,Ø:POKES3,Ø:FORA=1TOD2:NEXTA,I
74Ø POKEV,Ø:GOTO27Ø
75Ø MU(Ø)=187:MU(1)=2Ø1:MU(2)=2Ø9:MU(3)=228
    :D=45
76Ø POKEV,7:FORI=ØTO3:POKES3,MU(I):FORA=1TO
    D:NEXTA,I:POKES3,Ø:POKEV,Ø:RETURN
77Ø DATA2Ø9,58,2,2Ø1,58,2,215,58,2,195,58,2
    ,219,6Ø,6Ø,195,2Ø9,6Ø,6Ø,2Ø9,221,24Ø,2
8ØØ GETC$:IFC$=""THEN8ØØ
81Ø IFC$="Q"THEN83Ø
82Ø C=VAL(C$):RETURN
83Ø :PRINT"{SHFT CLR}{CTRL 7}":POKE36869,24
    Ø:POKE52,3Ø:POKE56,3Ø:POKE36879,27:END
9ØØ PRINTD$;:FORI=1TO65:PRINT"@";:NEXT:PRIN
    TD$;:RETURN
```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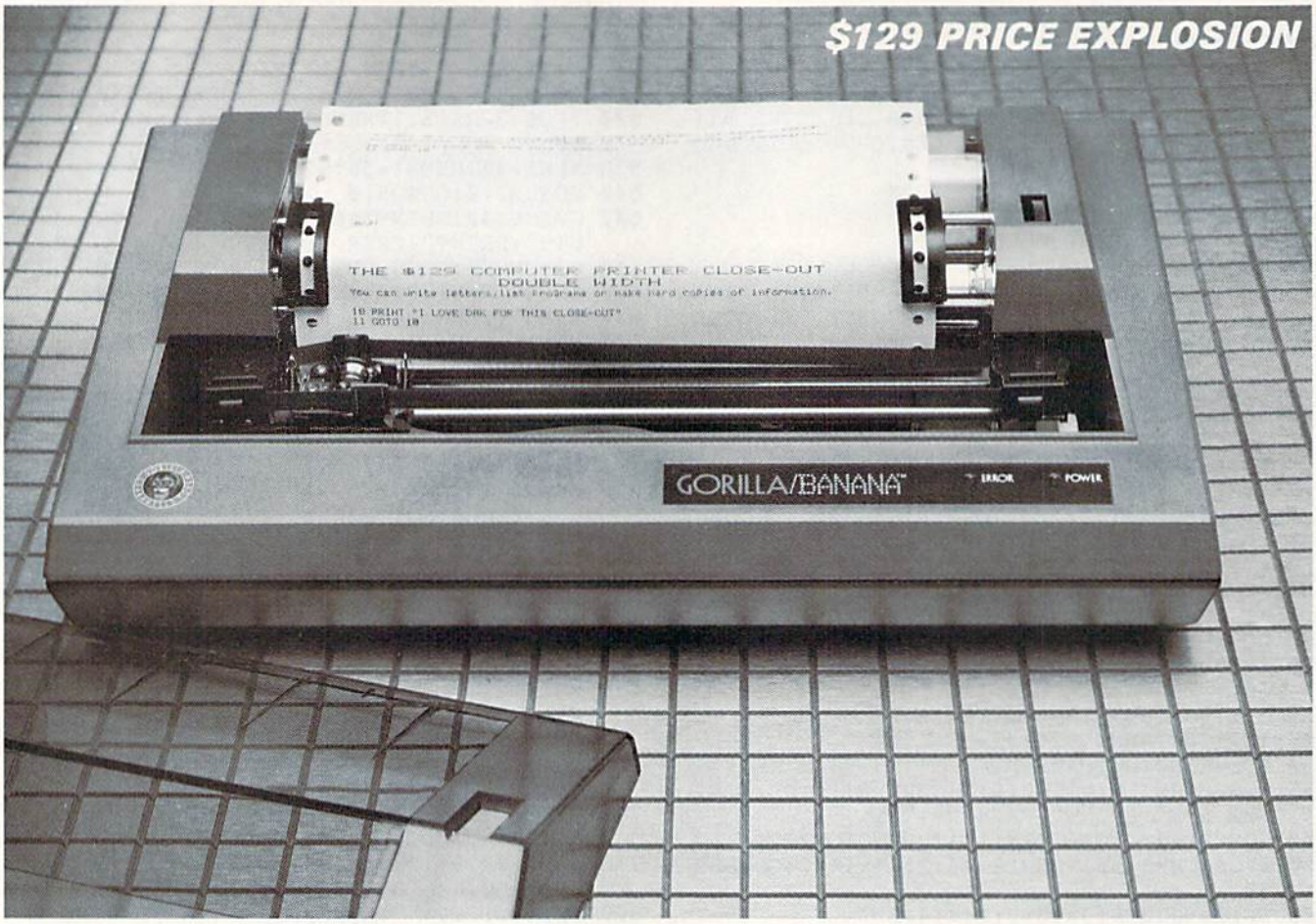
$129 PRICE EXPLOSION
THE $129 COMPUTER PRINTER CLOSE-OUT
DOUBLE WIDTH
You can write letters, list programs or make hard copies of information.
10 PRINT "I LOVE DAK FOR THIS CLOSE-OUT"
11 GOTO 10
GORILLA/BANANA™
ERROR
POWER

The Complete Computer

Here's a 50 character per second, plain paper, dot matrix printer that you can use with virtually any home or office personal computer. It's built really tough to withstand heavy use. It's really easy to use. And, it even prints graphics. Price Slashed to $129.

By Drew Kaplan

Complete your computer. Now you can harness the full power of your computer. From writing letters to listing programs, your computer will be incredibly more useful.

It uses **plain paper** and it's super reliable. It prints both upper and lower case characters. And, if you aren't using a printer with your computer, read on.

LISTING/INDEXES/LETTERS AND MORE

Experience the thrill of actually writing your letters and reports on your computer. Now you'll be able to use all of your computer's word processing and **correcting** capabilities to really explore your creative talents.

It's easy. Some of the new word processing programs are so 'user friendly' that you can learn to use them in just about 10 minutes. Change a line, change a word, move a line. Just push a button.

Are data bases a four letter word? Not on your life. Now you can use your computer to organize all your telephone numbers, your stocks, stamps, and recipes.

If you're using your computer for business, you can have a complete, instantly accessible file for each customer by name, what they bought, when, etc.

A data base will let you find or organize and print out any information you want, however you want, whenever you want.

There's no more complicated programming required. And, inexpensive data base programs are availible at any computer store.

PERMANENT RECORD

If you have a modem, you're in for a treat. You can access encyclopedias, stock market reports, and much more. When you sign on a service like Com puServe or The Source, the world is quite literally at your finger tips.

With a printer, you can get a 'hard copy' of all the incoming information. You can get everything from SAT test simulations and IQ tests to loan amortization schedules.

AFRAID OF PROGRAMMING?

You don't need to know the first thing about programming to use this or any printer. But, if you've never typed in and run a program, here's the easiest one I know. Turn on your computer.

Commodore Owners, and Atari Owners, your computer, and most others will say 'Ready'. Just push Control and Reset on an Apple. Then type the following:

10 PRINT "DAK IS WONDERFUL"
20 GOTO 10
RUN

You should type a carriage return at the end of each line. Why not try this program now? Next time, I'll tell you how to get out of the program, and maybe even discuss peeks and pokes.

If the program isn't running, type LPRINT instead of PRINT in line 10.

To you sophisticated programmers, think how easy your life will be when you can print out program lists that you can study at length.

And, you won't have to load a bunch of disks to find a program when you print out a menu for each of your disks.

LOOK AT ALL IT DOES

An ad in several August computer magazines listed a $149 thermal printer (that needs expensive thermal paper) as the lowest priced printer in the U.S.

Imagine a 50 character per second, plain paper, full 80 column dot, matrix printer with a built-in standard Centronics Parallel Interface, slashed to just $129.

This printer handles plain old cheap standard fanfold pin feed computer paper from 4.5" to 9.5" wide, with it's built-in adjustable tractor pin feed drive.

It's so powerful you can even use two-part forms for a carbon copy. Plus, there's an impact control for print darkness.

It understands and prints 116 upper and lower case characters, numerals and symbols. And that's not all.

You can even print Double Width characters. **And, look at this.** This printer has full graphic capabilities with 480 dot horizontal resolution and 63 dot per inch vertical resolution. So, you can print out your pictures, pie charts or graphs.

It prints 10 characters to the inch, six lines to the inch. In short, it's going to make typewriters into dinosaurs. When hooked to your computer, you'll never have to retype anything again. If you find an error, just make the correction and let the computer retype your work for you.

The printer is made by C.ITOH/Leading Edge in Japan. It's built to really take heavy use. But in the unlikely event that it should need service, there are approximately 400 service centers nation wide.

It takes standard long life inked ribbon cassettes that are readily available nation-wide. This is a printer that will give you many years of continuous reliable service and enjoyment.

AND NOW THE BAD NEWS

If you're the president of a large company sending important business letters, you may want a $1000 daisy wheel printer. But for most uses, dot matrix printers are incredibly faster, and there isn't any way to print out a graph or picture on a daisy wheel printer.

But, there are two things you need to know about this printer. First, it has about the dumbest name I've ever seen. It's built tough and rugged. So, they named it The Gorilla Banana Printer.

Second, like many dot matrix printers, the letters g, j, p, q, and y are level with the other letters. Each letter is completely and perfectly formed, but each sits level with the rest of the alphabet.

Upper case letters and symbols are unaffected. So, if you don't want letters that look like they were printed by a computer, this printer isn't for you.

But for most letters, term papers or reports, programming and all the data bases and information you'll get through a modem, this printer is perfect.

COMPATIBLE COMPUTERS

Any Computer with a standard Centronics parallel port, such as: **Apple, Franklin, IBM PC, TRS80, Osborn, Atari, Commodore VIC 20, Commodore 64, Kaypro, and virtually any other personal computer. Plus, most briefcase portables.**

FEAR OF INTERFACES?

Your computer is smart. But, it doesn't know how to 'talk' to other devices. That's why you need an interface.

An interface isn't just a cable. It's actually an intelligent translator that lets your computer talk to other equipment.

Usually the computer manufacturers don't include the various interfaces when you buy your computer, because they don't know if you'll ever add peripherals such as disk drives, printers or modems.

So, rather than sell you something you don't need, you don't buy an interface untill you add onto your computer.

There are two types of printer interfaces. The first allows you to do text word processing. For 99% of computer use, this is all that is needed. It translates all the possible letters and punctuation known as ASCII. This printer understands 116 characters and symbols.

A second type of interface **also** allows you to dump pictures or graphics from your screen or memory. This is more complicated because every dot must be told where to go. This interface, or 'driver program' as it is called, is available in two forms; built into an interface card, or as a program on a disk which you use in conjunction with any standard interface.

Either way, you'll have the printer operating in just a few minutes. And if you already have a printer, the same Centronics parallel interface and cable (about 85% of all printers are compatible) should work with this printer.

With this printer you can alter your graphics as you desire. You can print normal or reversed (both shown above, reduced to fit in this catalog) and you can even print double size.

WHY SO CHEAP

A new model will emerge soon with a different name. Leading Edge had just 28,000 of these remarkable printers which have been selling at discount for as little as $199, left in stock.

DAK bought them all for cold hard cash. And now we're offering them to you for less than the original price we were quoted as wholesale.

The printer is approximately 16½" wide, 9" deep and 7" tall. It's backed by Leading Edge's standard limited warranty.

ADD PRINTING POWER TO YOUR COMPUTER RISK FREE

Now you can really make use of your computer. 50 characters per second printing on plain paper for just $129. Wow!

Now you can print out your programs, your notes or your letters. If you're not 100% satisfied, simply return the printer and any accessories in their original boxes to DAK within 30 days for a refund.

To order your 50 Character Per Second Dot Matrix, Plain Paper Printer with a built-in Centronics Parallel Interface, risk free with your credit card, call toll free, or send your check for the breakthrough close-out price of just **$129** plus **$8** for postage and handling to DAK. Order No. 4101. CA res add 6% sales tax.

Special Note: If you need a serial printer for a computer, such as the TRS80 Color Computer, order the identical printer with a built-in Serial Interface for the same price. Use Order No. 4102.

The Printer comes packaged with a long life ribbon. Extra ribbons are available at computer stores. DAK has them for **$4** each ($1 P&H) Order No. 4103.

Standard Centronics Interfaces for your computer are available at any computer store. This Printer has its receiving interface built in. You simply need one, complete with its cable, to plug into your computer 'to send' information. Below are our favorites for 5 of the most popular computers.

For your Apple. We have Practical Peripherals' text interface for just **$49** ($2 P&H) Order No. 9877. We have their graphics capable interface for just **$79** ($2 P&H) Order No. 4104. If you already have a Centronics Parallel Interface, we have a graphics driver program on disk for just **$7** ($1 P&H) Order No. 4105.

For your IBM PC, you don't need an interface. It's usually already built-in. But, you do need a cable. We have a cable, ready to connect this printer to your computer, for just **$19** ($2 P&H) Order No. 9879. We have a graphics driver program on disk for just **$7** ($1 P&H) Order No. 4106.

For your Atari 800, 800XL, 400, or 600XL, we have a text interface for just **$69** ($2 P&H) Order No. 9881. We have a graphics driver program on disk for just **$7** ($1 P&H) Order No. 4107.

For your Commodore VIC 20 or 64, we have a text interface for just **$39** ($2 P&H) Order No. 9883. We have a Graphics Interface for just **$54** ($2 P&H) Order No. 4108.

Special Bonus for Commodore 64 owners. We have a powerful word processing program with editing, including changing a line, a word, or moving a line. Once you've tried computer word processing, you'll never want to look at a typewriter again.

Plus, we have a super data base program that lets you use 8 fields of information on up to 200 subjects at a time. Then you can search for any part, sort alphabetically or numerically and print out an address book, a list of your stocks or anything you can imagine. They're both yours for just **$5** ($1 P&H) with purchase of the printer. Use Order No. 4122 for Disk, or Order No. 4123 for Cassette.

For most TRS 80 Computers, you don't need an interface, just a cable. For the Black and White Computers, we have a Parallel Cable for just **$18** ($2 P&H) Order No. 9885. For the Color Computers we have a Serial Cable (you need the Serial Printer as well) for just **$18** ($2 P&H) Order No. 4109.

For **briefcase-type** portables, the Centronics Interface is usually built-in. Just stop by any computer store. All Centronics Printers use the same cable at the printer end, but you'll need a cable that fits your particular computer's plug.

Get hard copy print-outs of your programs or your graphics. Turn your computer into a powerful word processor. Forget retyping ever again. For just $129 you can make your computer complete.

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From p. 12.

character in line 510 will change the amount of the prompt that flashes. Once any key is pressed, the subroutine returns with A$ equal to the character that was entered.

Frank C. Gutowski
Cheswick, PA

$1AF Customized Ready prompt—We have changed the C-64 operating system, so that instead of the Ready prompt, a customized message will appear. To do this, lines 10–20 transfer the basic operating system to RAM. Line 30 causes the Ready prompt to be looked for at memory location 828 rather than its usual place. Lines 40–60 put the new prompt into locations 828 on up.

```
10 FOR J=40960 TO 49151 : POKEJ,PEEK(J) : NEXT
20 POKE 1,PEEK(1)AND254
30 POKE 42101,60 : POKE 42103,3
40 FOR J=0 TO 33 : READ K : POKE J+828,K : NEXT
50 DATA 013,010,087,072,065,084,032,083
60 DATA 072,079,085,076,068,032,073,032
70 DATA 068,079,032,078,079,087,044,032
80 DATA 077,065,083,084,069,082,063,013
90 DATA 010,000
```

If you put this routine at the beginning of some of your programs, you can have a lot of fun. Line 10 takes some time to do its work, but the results are worth it.

Those who know about CHR$ codes can construct their own message by changing the Data statements shown here. The first two and the last three must always be as shown, but you can put any reasonable number of characters in between. The possibilities are limitless, and a lot of action can be had from very little work.

Brian Axford
Petawawa, Ontario
Canada

$1B0 Word tricks—It's well known that shifted characters in REM statements can List in unusual ways. Having considered this quirk at length, we've created a brand-new literary form. If you run the program below, you'll see just what we mean.

When typing it, be extremely careful with the characters in the answers; a single error can ruin the entire line. In the answer lines, we've spelled out every character following the colons, since that is the most critical area. As you type, don't put spaces where they're not called for, and carefully watch your shift and Commodore keys. In the answers, all the spaces and a few of the letters are unshifted.

After typing the program, you should save it first, then run it and follow the instructions. The quotes to be deleted are those at the beginning of the answer lines.

```
100 LIST
110 REM ** COMPUTER MAGIC & TRIVIA **
120 REM
130 REM THINK OF YOUR ANSWERS,
140 REM THEN DELETE THE QUOTES
150 REM AND RE-LIST THE PROGRAM.
160 REM
170 REM  Q:  WHY DID THE COWARDLY LION
180 REM      VISIT THE WIZARD OF OZ?
190 REM "  A: {2 SPACES}{COMD @}{SPACE}{SHIFT X}
               {SPACE}{SHIFT E}{COMD A}
200 REM
210 REM  Q:  WHO EXPOSED THE WIZARD?
220 REM "  A: {2 SPACES}{COMD @}{COMD @}
230 REM
240 REM  Q:  WHAT DID THE WIZ SAY THEN?
250 REM "  A: {2 SPACES}{COMD LB.}{SPACE}{COMD @}
               {SPACE}{SHIFT B}
260 REM
270 REM  Q:  WHAT CAN A GOOD WITCH DO
280 REM      WITH A SPORTS BROOM?
290 REM "  A: {2 SPACES}{COMD -}{SPACE}{SHIFT -}
               {SPACE}A{SPACE}{SHIFT R} E.
```

Louis F. Sander
Pittsburgh, PA

$1B1 Word trick contest—If you liked the trick above, develop something similar and send it in to Magic. We'll print the best submissions, and we'll pay at our usual rates. Include the plain-text listing as well as the REM-coded form, so we can see the result without typing.

The Question-and-Answer format has lots of possibilities, as the following lines will show, but it's far from the only style. We're looking for creative use of the shifted character principle—give it any form you'd like, and send us your best results.

```
10 REM  Q:  WHAT DID MRS. FLINTSTONE
20 REM      SAY WHEN THE FIRE WENT OUT?
30 REM "  A: {2 SPACES}{COMD U}D, {SPACE}{SHIFT K}
               {SPACE}{COMD K}{SPACE} A {SPACE}{COMD
               C}
40 REM
50 REM  Q:  WHY DO LEONARD AND VALERIE
60 REM      GET A'S IN COMPUTER CLASS?
70 REM "  A: {2 SPACES}{SHIFT C}{SPACE}{COMD P}
               {SPACE}{SHIFT E}{SPACE}{SHIFT S}{SPACE}
               {SHIFT V}
```

L.F.S.

$1B2 Defining variables—It is sometimes desirable to define Basic variables in a certain order, particularly where execution speed is critical, and we want frequently used variables to be at the top of the heap.

To accomplish this, it is not necessary to assign a value to each variable, as most programs do. Commodore Basic allows you to establish variables in order, each with a value of 0, by using the DIM statement:

```
DIM X,Y,Z,A,P1,P2
```

Although the manuals make no reference to this use, the DIM command is not restricted just to array variables.

I. Adam
Vancouver, BC

$1B3 Random numbers, all different—This routine generates a series of random numbers, of which no two are the same. It is perfect for programs

involving decks of cards or for lottery-type programs where the restrictions do not allow for duplication. The number of elements to be selected from is A; to choose numbers ranging from 1 to 40, set A = 40. The number of selections to make is B; to draw six numbers, set B = 6.

```
20 N=1 : DIM P(A)
25 X=INT(RND(0)*A+1) : IF N>1 THEN 200
30 P(N)=X : PRINT P(N) : N=N+1
35 IF N=B+1 THEN END
200 FOR M=1 TO N : IF X=P(M) THEN 25
210 NEXT M : GOTO 30
```

Gene Majewski
Schiller Park, IL

**$1B4 Time format**—The TI$ variable is somewhat confusing, since it includes hours, minutes and seconds with no separators. Since TI$ is a string variable, the string manipulation commands can be used to add a colon and drop off the seconds.

```
100 PRINT LEFT$(TI$,2) ":" MID$(TI$,3,2)
```

Mark Doble
Mons, Belgium

$1B5 Data debugging—Sometimes when using a checksum program to assist in the correct entry of Data statements, you continue to get checksum errors even though the data items seem to be correct. In those cases, you probably have a punctuation error in your Data statements, such as a period instead of a comma, or an extra comma that adds a spurious zero to your data.

Marie E. Coon
Bothell, WA

$1B6 Vanishing variables—Shift your computer into Lowercase mode, then type in the following program (you'll have to shift to get the uppercase letters).

```
10 DATA XYZend
20 N=5
30 READ N$ : PRINT N,N$
```

Now run the program and observe that the computer ignores it completely. List the program, and notice that not much of it remains. The moral is to be cautious when typing in Lowercase mode, since your computer ignores shifted letters unless they are in quotes. Use only unshifted letters for commands and variables, or some very strange bugs may appear.

Marion Maddocks
Glenwood, IA

$1B7 Warm/cold starts—The *C-64 User's Guide* gives the command SYS 64759 to reset the machine and clear its memory, or, in other words, to reset to a cold start. In reality, this command resets the machine to a warm start, or the same state it's in after pushing the run/stop and restore keys. The default colors are returned, but your program stays in memory. The correct command for a cold start is SYS 64760.

Linda Zolinski
Milwaukee, WI

$1B8 Better For...Next delay loops—The following line is often used to wait until a key is pressed or a certain time has passed.

```
100 FOR T=1 TO 2000 : GET A$ : IF A$="" THEN NEXT
110 Continuation of program
```

The above method usually works fine, but it includes a potentially fatal bug, since it can exit the For...Next loop without executing the Next. When such an exit is made, the computer's stack pointer is not restored to its proper value, and the chance of an Out Of Memory error is greatly increased. It is better to use something like this:

```
100 FOR T=1 TO 500 : T=T+(500-T)*PEEK(198) : NEXT :
    POKE 198,0
110 Continuation of program
```

Location 198 contains the number of entries in the keyboard buffer. When no key is pressed, the loop sets T = T, then increments T; it finishes as soon as T = 500. As soon as a key is pressed, PEEK(198) = 1, setting T = 500. The loop is satisfied without corrupting the stack pointer.

If you begin line 100 with POKE 198,0 you will clear any previous keypresses before starting the delay loop. If you want to have the loop exit only when a certain key is pressed, you can do this:

```
100 FOR T=1 TO 500 : T=T-(500-T)*(PEEK(197)=X) : NEXT
    : POKE 198,0
110 Continuation of program
```

In this line, X would equal the value for the desired key as determined by the keyboard matrix table. You can find the value for the key you want by running this:

```
1 PRINT PEEK(197) : GOTO 1
```

When you press the key of interest, its matrix value will appear on the screen. This is the value you should substitute for X.

Katherine Myers
Fresno, CA

$1B9 Longer shortcut?—Using Boolean expressions to condense a series of If...Then statements into one ON statement may seem shorter and faster, but it is not! For example, the series

```
5 IF A=1 THEN 500
6 IF A=2 THEN 600
7 IF A=3 THEN 700
```

is written in Boolean as:

```
5 ON -(A=1)-2*(A=2)-3*(A=3) GOTO 500,600,700
```

It looks shorter and faster, but the three If...Then lines take up 27 bytes as tokens, and the ON statement takes 36 bytes. Also, the If...Then series is evaluated faster be-

cause the Boolean statement has to do all the arithmetic involved as well as just evaluate the expression.

Marilyn Sallee
Alliance, NE

$1BA To float or not to float—Does a floating-point variable or integer variable use less memory? Each side has its advocates, but the real answer asks another question first—how is the number used? As a single variable, such as a simple counter, using I is shorter than I% by the one byte needed to type the %. Otherwise, they use exactly the same amount of memory. However, if you use an integer array, then I%(J) will use much less memory than storing the same numbers in array I(J) because the computer stores integer arrays more compactly.

Marilyn Sallee
Alliance, NE

$1BB Bad spelling—(See trick $1B0.)

```
300 REM   Q:   NAME DOROTHY'S CAPITAL
310 REM "   A: {2 SPACES}{COMD @}{SHIFT B} A
```

Leonard Pinth-Garnell
New York, NY

$1BC Paper saver—You can save paper by saving your old program listings and so on. When you need to print something for your own use, use the reverse side of these discarded listings. This has worked well for me, especially with the higher quality paper.

Mary Brigito
Old Forge, NY

$1BD Open command glitch—Any time the Open command is used with device number 2, all variables and arrays are cleared. Device number 2 is reserved for RS-232 devices, and activating it makes some internal changes to prepare for RS-232. Whether or not you have an RS-232 device connected, OPENx,2,y will clear all your variables. Therefore, be very careful about using device number 2 at any time. If you're writing a program involving an RS-232 device, be sure to open your channel before setting any critical variables.

Heather Albright
Ventura, CA

$1BE 1526 print sizes—Since printer manuals are hard for beginners to understand, many owners of Commodore's 1526 may not be aware that there are actually four sizes of print available. There is the regular size, plus three horizontally expanded fonts. The program below illustrates them very nicely.

```
2 A$=CHR$(14)
4 OPEN4,4
6 PRINT#4,"THIS IS REGULAR PRINT"
8 PRINT#4,CHR$(13)
10 PRINT#4,A$;"THIS IS ENHANCED PRINT"
12 PRINT#4,CHR$(13)
14 PRINT#4,A$;A$;"GETTING BIGGER"
16 PRINT#4,CHR$(13)
18 PRINT#4,A$;A$;A$;"LARGEST!"
20 PRINT#4,CHR$(13)
22 CLOSE4
```

Gregory L. Bues
Milford, CT

$1BF Better printed listings—Commodore's 1526 printer has a little-understood paging mode that allows it to skip over the perforations between sheets of paper. With very little effort, you can use this feature to get nice top and bottom margins on your multipage listings.

To try it out, put a long Basic program in memory—one that takes more than a page to list on the printer. Align the paper in your printer so the top of the sheet is just barely under the two black rollers on the movable paper bail, and enter the following line in Direct mode. The title can be anything at all and, if you'd like, can be omitted.

```
OPEN4,4 : CMD4,"{SHIFT CLR}TITLE" : LIST
```

Then watch as your printer makes a professional-quality listing. When the listing stops, don't advance the paper by hand. Instead, enter, in Direct mode:

```
PRINT#4,"{HOME}" : CLOSE4
```

You'll see the paper advance so the bottom perforation is right at the tear-off point on the silver bar that covers the platen.

You can add the following lines to any program, and a GOTO 10000 will get you a similar listing, but with a customized heading for the date or anything else you'd like. When the listing is finished, your cursor will be positioned so you can feed your sheet just by pressing the return key.

```
10000 REM ** LIST ON 1526 PRINTER - PERFS AT ROLLERS
10010 INPUT"HEADING";A$
10020 PRINT"{SHIFT CLR}{CRSR DN}PRINTCHR$(19) ; :
      PRINT#4:CLOSE4{2 CRSR UPS}":OPEN4,
      4:CMD4:PRINT"{SHIFT CLR}"A$:LIST
```

Remember, a question mark *cannot* be used in abbreviating the Print# statement.

Louis F. Sander
Pittsburgh, PA

$1C0 Proofreading tip—After you've typed in a program from a magazine, it's often necessary to proofread your work. This job can be made easier by listing your program onto the printer, then proofreading the printout against the original copy. Compared to reading the screen, reading the printout is easy on the eyes, and it's much easier to find errors. This method is also timesaving, since you don't have to keep listing to the screen.

Roberta Roberts
Chesapeake, VA

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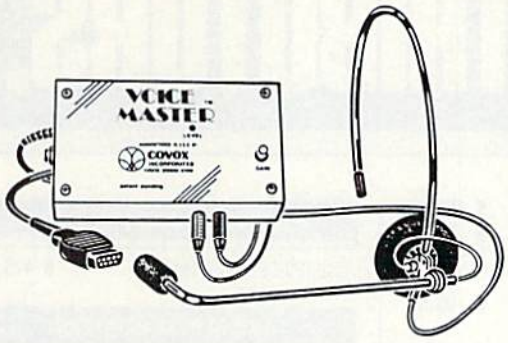

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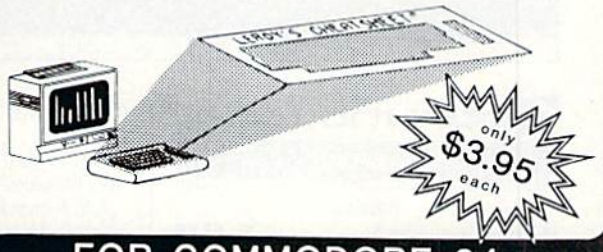

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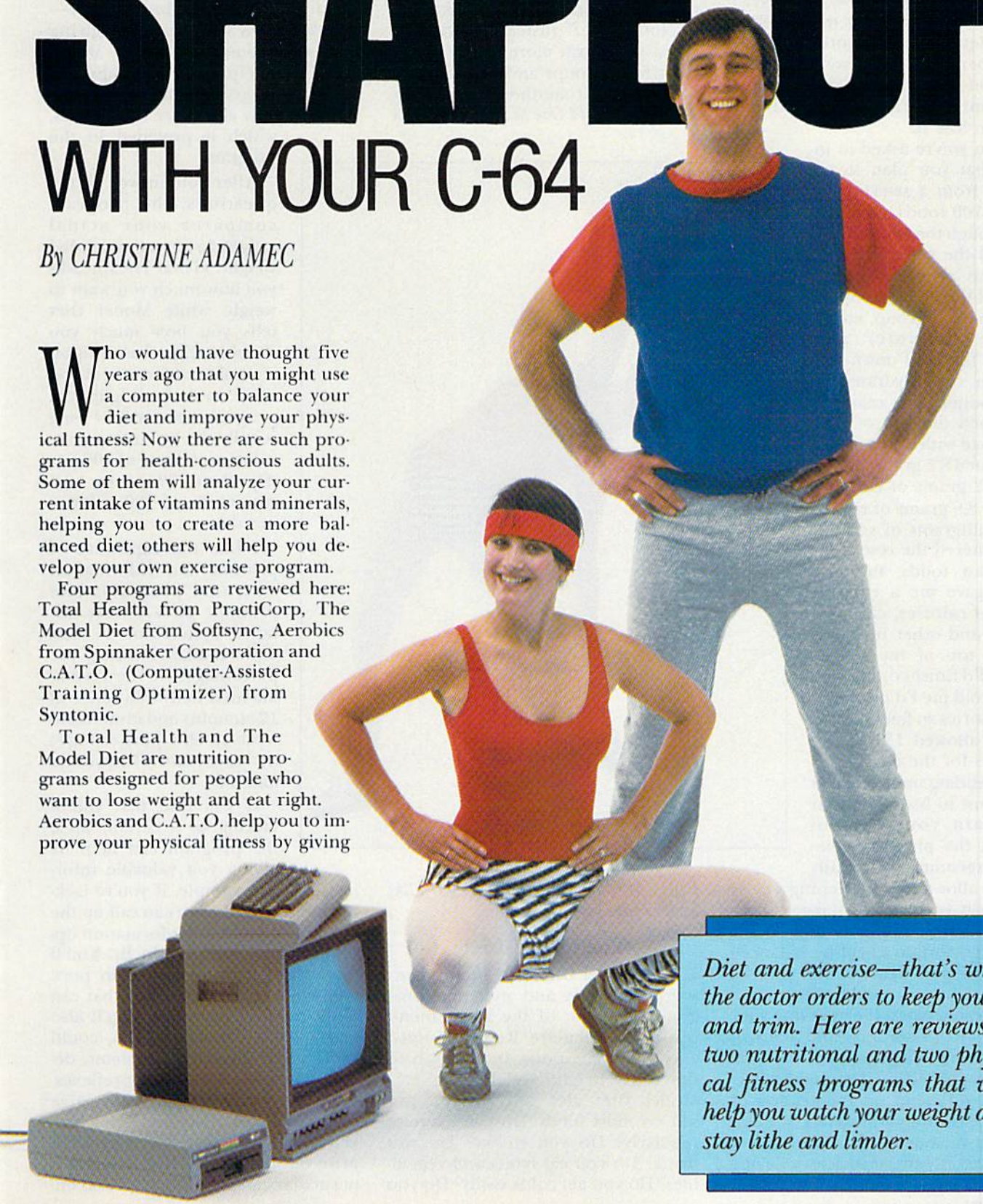
By CHRISTINE ADAMEC



Diet and exercise—that's what the doctor orders to keep you fit and trim. Here are reviews of two nutritional and two physical fitness programs that will help you watch your weight and stay lithe and limber.

Who would have thought five years ago that you might use a computer to balance your diet and improve your physical fitness? Now there are such programs for health-conscious adults. Some of them will analyze your current intake of vitamins and minerals, helping you to create a more balanced diet; others will help you develop your own exercise program.

Four programs are reviewed here: Total Health from PractiCorp, The Model Diet from Softsync, Aerobics from Spinnaker Corporation and C.A.T.O. (Computer-Assisted Training Optimizer) from Syntonic.

Total Health and The Model Diet are nutrition programs designed for people who want to lose weight and eat right. Aerobics and C.A.T.O. help you to improve your physical fitness by giving

you exercise programs that you can tailor to suit your own needs.

Total Health

After you've loaded your tape or disk, Total Health starts by asking you some questions. Are you male or female? Pregnant? Nursing? And on an activity level of 1–5 (with 1 being low), where do you stand? (The manual explains that a person on level 1 burns 250 calories per day, whereas an athlete on level 5 burns 1600 calories per day.) Next, you are asked how old you are, how much weight you want to lose and how quickly you want to lose it.

Then you're asked to input what you plan to eat today, from a selection of about 100 foods. (You can go through the entire menu to find the right foods, or you can press f1 for the start of the dairy group, f3 for the meat group, etc.)

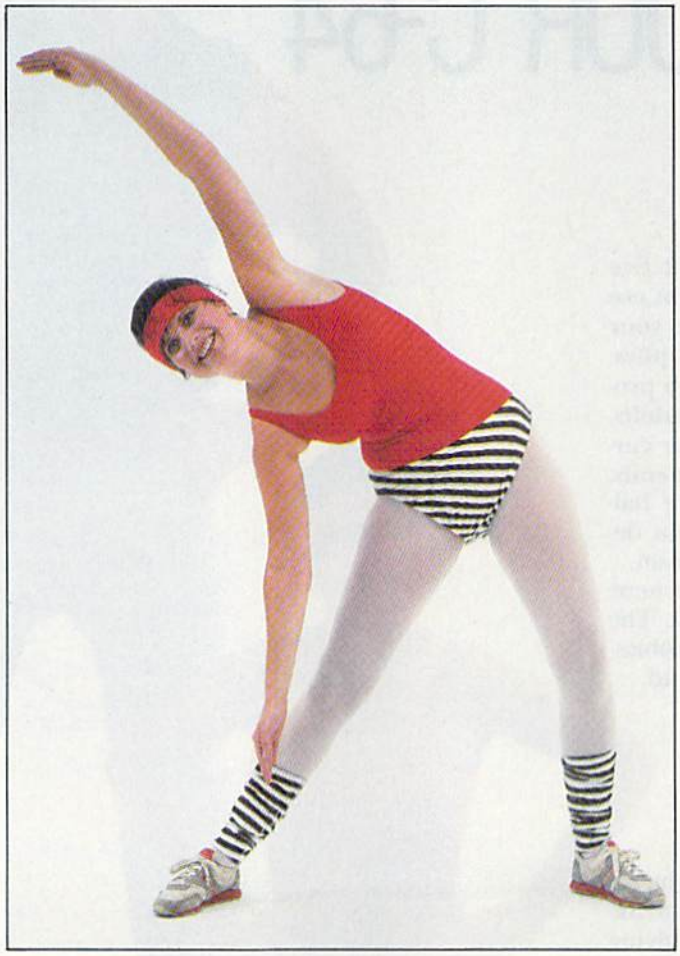
The computer also breaks the food down into protein, carbohydrates, fat and sodium. For example, I learned the cup of milk that I had with my breakfast contained 8.5 grams of protein, 12 grams of carbohydrates, 8.6 grams of fat and 122 milligrams of sodium. As I entered the rest of my breakfast foods, the program gave me a running total of calories, carbohydrates and other nutrients at the top of my screen. When I'd finished, the computer told me I'd devoured 455 calories so far, and that I'd be allowed 1345 more calories for the day.

Depending upon whether you want to lose weight or maintain your current weight, the program gives you a recommended daily calorie allowance. By keeping a close watch on your daily intake of calories, vitamins, minerals and so on, you can maintain a healthy, balanced diet and still reach your desired weight.

You can create a file by saving your statistics to disk or tape, and then call up a graphics display on your screen. Bar graphs will illustrate exactly where you stand on the criteria of calories, carbohydrates, fats, sodium and the various food groups.

I have only two criticisms of Total Health. First, I would like a greater selection of foods. Second, I wish I could print out my data, especially the graphs. Sure, I can save my data, but I'm limited to viewing it on the screen, and I'd like something in hardcopy to study and show to my friends. Yet overall, Total Health is helpful and easy to understand.

As the manual puts it, Total Health "won't lock the refrigerator door, or make saltless crackers taste like devil's food cake." Instead, it will "instruct you to eat more of one of the basic food groups and cut down on your intake of another." *(PractiCorp, The Silk Mill, 44 Oak St., Newton Upper Falls, MA 02164. C-64/$29.95 disk; $24.95 tape.)*



The Model Diet

The Model Diet is a comprehensive weight-loss and nutrition program. The first of the seven menu options, Calculate Requirements, asks many questions. In addition to the usual height, weight, sex, etc., Model Diet also asks if you put salt on most foods. Do you exercise regularly? Do you smoke? Do you drink? Do you eat fruits and vegetables? Do you get colds easily? Do you live in a big city? Do you get headaches frequently? Do you become tense easily?

The program supposedly uses your answers to compute your needed vitamin and mineral intake, but neither the manual nor the screen tells you *how* it does that. What if you *do* get a lot of headaches? You could have a vitamin deficiency, a sinus condition or maybe a brain tumor—who knows? A screen message giving you some possible reasons would have been helpful. You can also opt to use the government's recommended daily allowance of vitamins, which is provided in the program.

After you answer all the questions, the program compares your actual weight to a recommended weight. (Total Health asks you how much you want to weigh, while Model Diet tells you how much you should weigh, based upon a number of factors.) If you need to lose weight, the program reveals how long it will take by cutting your calories at a rate of 100 per day, then 200, on up to a maximum of 700 calories per day.

I like the capability of printing out information with this program. The printout gives a very detailed breakdown of your daily intake, showing the percentages of the recommended daily allowance of 12 vitamins and minerals as well as the percentages of your individualized amounts.

If you find that you're lacking in a certain area, the program can help by giving you valuable information. For example, if you're lacking in vitamin B_1, you can call up the vitamin and mineral information option and ask for vitamin B_1. You'll discover that beef, liver, lean pork and whole grains are foods that can build up your B_1 intake. You'll also learn that a deficiency of B_1 could cause gastrointestinal problems, decreased alertness and slower reflexes.

Model Diet offers an exhaustive listing of nearly 2000 food types, broken down into 16 categories. You can print out the whole food listing or a particular category. You can also en-

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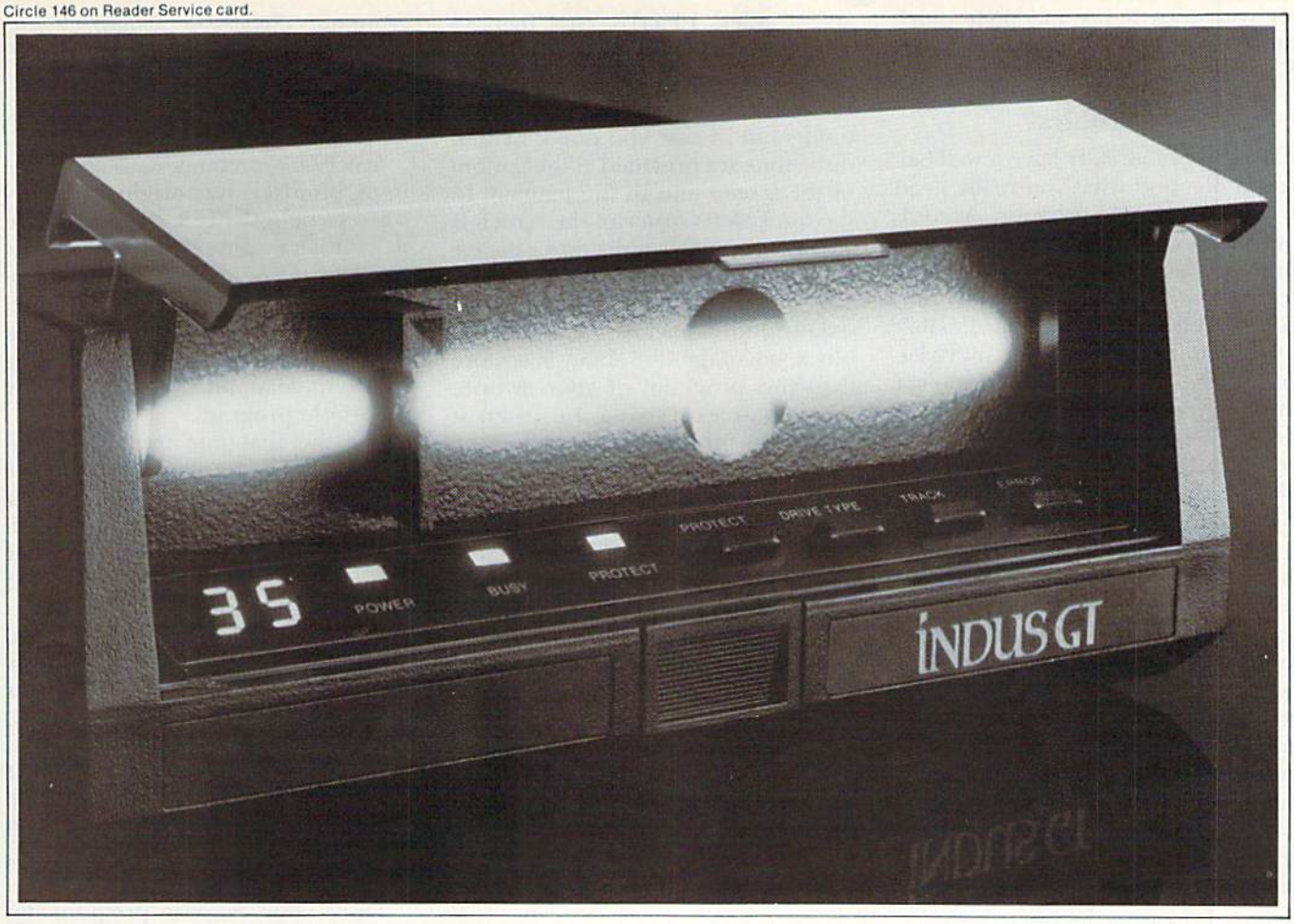

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ter your own items and their nutritional value. *(Softsync, 14 East 34th St., New York, NY 10016. C-64/$29.95 disk.)*

Aerobics

Maybe you already have a well-balanced diet and what you really need is a good exercise program. According to their manual, Spinnaker's Aerobics disk is designed not only to "provide you with a total fitness program to relieve stress, provide flexibility and muscle tone, and increase endurance," but also to "help you get in touch with the way your body works." The program offers you a cute graphic of a woman in leotards, complete with sweatband, who bounces, jogs and exercises on your screen.

You can elect beginner, intermediate, advanced or "a la carte" exercises. (A la carte gives you a list of about 20 different exercise groups.) You start off with warm-up exercises (which you can skip, if you like). The aerobic exercises are next, then cool down exercises. You can spend 25 minutes on the program or up to an hour and a half—it's your choice.

Here's an example of a 3½-minute aerobics routine: 15 jogs, 15 hop-scotches, 10 jumping jack twists, 10 side-to-sides, 10 criss-cross feet, 15 jogs and aerobic stretches.

You should be able to easily understand what the on-screen figure is doing, but in case you don't, written directions are provided at the bottom of the screen and in the manual. In the upper-left corner of the screen is a counter, which counts down the exercises as she (and you) finish each set. The whole program is explained thoroughly and explicitly. Sure, you can buy a videotape (for about $20 more than this program) of your favorite movie star exercising, but then it would be the same old stuff every time. With the Aerobics program, you can customize and change it to your individual needs and time constraints.

Any criticisms? Each part of the program has its own music, but I quickly grew tired of it. (The manual says you can turn on your own stereo if you'd prefer, so they've obviously anticipated this objection.)

At first it felt awkward exercising with my computer, but so what? No one's around to laugh hysterically at me when I go through my paces. And the program is a whole lot cheaper than joining a health club, where you'll have to stick to its particular regimen. *(Spinnaker Software Corp., 215 First St., Cambridge, MA 02142. C-64/$44.95 disk.)*

C.A.T.O.

C.A.T.O. (Computer-Assisted Training Optimizer) was originally developed to help the U.S. Army evaluate its soldiers' physical fitness. This highly professional, very serious program includes a comprehensive notebook-sized manual with diagrams and descriptions of all exercises, as well as understandable directions for the whole program.

For the first-time user, the computer asks simple questions, such as your weight, height and sex. Do you want the 3-, 5- or 6-day workout schedule? (The program recommends that you start with the 3-day schedule.) Next you must input your measurements and determine your fitness, flexibility and strength. Several tests are given to determine your current level of fitness, including push-ups, pull-ups, sit-ups and other exercises. You'll also tell the computer which, if any, fitness equipment you have available to you. Then C.A.T.O. uses all this information to design your personal exercise program.

Once your exercise program has been designed, you can call up a screen display, which shows a hi-res graphic of a very well-toned man and woman flexing their muscles. No movement is shown, but the exercise name is shown, along with how many you should do and which muscles will benefit.

As you progress, you can call up the Graph mode and see a block display of your improvement. You can also select a nutrition option, which gives you dietary advice on calories, protein, carbohydrates, fat and fiber.

Over 100 exercises with varying levels of difficulty are included in this program, ranging from the isometric military press to jumping jacks and bench presses. There's something for everyone here.

C.A.T.O. is a detailed fitness program for the serious user. It's easy to use, very well documented and worth the price. *(Syntonic Corp., 543 South Fourth West, Missoula, MT 59801. C-64/$59.95 disk.)* R

Address all author correspondence to Christine Adamec, 1921 Ohio St. NE, Palm Bay, FL 32907.

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Looking for a new image? This article discusses the differences between television displays and video monitors, and poses the important questions you must ask.

WHAT YOU SEE IS WHAT YOU GET

By TOM BENFORD

Most Commodore computerists use the family television for their video output. While the screen display is usually good, such an arrangement can create problems. For example, if one family member wants to watch a television special and another wants to use the computer, the one television set can't accommodate both persons.

One solution might be to purchase a second television. Another solution might be to buy a monitor for use with the computer. Some monitors can even be used as televisions. If you're interested, stay tuned. You might even improve your image.

You'll See the Difference

The foremost reason for using a video monitor with your computer is because it provides a substantial improvement in the image. Once you understand the various ways an image is created on the screen, you will also understand why a monitor provides you with the best picture.

On a TV set, the broadcast signal is received by the antenna and fed into the set's circuitry. Through a rather complex series of interpretive steps, that signal is broken down into various components that provide color, image (raster/scanner) and audio information, thus enabling you to see and hear what is currently being shown on a given channel. Because this signal is carrying so much information, it is *modulated* so that certain bands of it carry the audio portion, while others carry the video, and so on.

The audio/video circuitry of your Commodore computer produces a *composite* signal for the video, with a separate carrier for the audio portion. The video portion is further separated into *luma*, or light signals, and *chroma*, or color signals. In brief, these signals are ready to be accepted by a composite video monitor just the way they come from the computer. This form, however, is not acceptable to your home TV, which uses modulated signals.

Your C-64 or Plus/4 has a built-in radio frequency (RF) modulator to convert the A/V chip's output into a form more palatable for the TV to accept. On a VIC-20, the RF modulator is the external black box; its cable plugs into the VIC on one end and the TV switch box on the other.

So, a TV needs a modulated signal, while a monitor needs a composite signal. Some monitors also accept another type of signal known as RGB, which simply stands for red, green

KATHERINE MAHONEY

and blue. Since Commodore computers do *not* put out this form of video signal, you should be aware that you *cannot* use a monitor that has RGB input only; you need a composite video (input signal) monitor.

Expressed in the simplest terms, a TV signal is modulated, or bounced. Because of this modulation and other factors, the signal often isn't at its purest.

Composite signals, on the other hand, are in a refined and pure form, with no bouncing. This permits a much cleaner signal that, in turn, generates the clearest picture. However, there's a bit more to it than just the type of signal.

A composite color monitor will give your Commodore the best video image.

A Resolution Revolution

A video image is composed of pixels. Look closely at your TV or monitor screen and you'll notice that the picture is composed of tiny dots, much like the dots in a newspaper photograph. These are the pixels.

Video *resolution*, or a picture's clarity, is measured in pixels; the more pixels, the better the resolution. Here's why.

The more closely the pixels are packed together, the more video information is displayed. This is particularly noticeable in images with curves or lots of color combinations. Having more dots in a given area allows the curve to be smoother or the separation of the colors sharper and crisper. Where there are fewer pixels, the resulting picture may have image smear and/or color bleed.

Television sets have lower resolution than video monitors because the FCC has standards with which home televisions must comply. Included in these standards is the fixed number of pixels that will produce a certain resolution ratio. The broadcast signal must also comply with these standards. The resolution standard for broadcast is on the low side because of the bouncing modulated signal. A composite signal carries much more video resolution (pixel) information than a modulated signal.

MONITOR FEATURE COMPARISON CHART

Manufacturer and Model	Color/ Monochrome	Screen Size/ Inches	Resolution in Pixels	Suggested Retail Price
AMDEK Color 300	Color	13	260 × 300	$349
BMC 9191U+	Color	13	260 × 300	$329
COMMODORE 1702	Color	13	250 × 300	$299
COMREX CR-6500	Color	13	260 × 300	$324
NEC JC1212MA	Color	12	Not Available	$399
SAKATA SC-100	Color	13	280 × 300	$329
SAKATA SA-1000	Amber Monochrome	12	Not Available	$159
SAKATA SG-1000	Green Monochrome	12	Not Available	$159
SANYO DMC6500	Color	13	350 × 350	$345
TSK ELEC. CORP. 210 VISION-III	Color	13	380 × 240	$400
ZENITH 131	Color	13	250 × 280	$379

Table 1. *Comparison of monitor features.*

What to Look For

Just as there are black-and-white and color televisions, there are also monochrome and composite color monitors. With monochrome monitors, you have your pick of austere black-and-white, amber or green phosphor screens.

Black-and-white monitors are the least expensive. They're suited for applications where the displaying of text information is of primary importance. However, many users find that the harsh contrast of a black-and-white screen is hard on the eyes.

If you're going to be spending a lot of time at the screen, amber or green phosphor displays are easier on the eyes. Generally, the cost of an amber or green phosphor display is only about $10–$25 more than a comparable model with a black-and-white display. Owing to the lack of color in the image, however, they are poorly suited for color graphics or gaming applications.

Before I discuss color-composite monitors, let me say a few words about sound. Many of the inexpensive monochrome monitors don't have any built-in speaker, which means that you'll have a picture, but no sound!

When you shop for a monitor, make sure you check to see whether or not it has a speaker. If you buy one without a speaker, you'll have to jerry-rig the sound output to your home stereo or other such audio amplifier.

Another nice feature is an earphone jack, so you can plug in a pair of headphones and listen to your games' sounds without disturbing others.

Most low-end, "economy" monitors won't have a speaker or an earphone jack, so you might want to pay an extra ten bucks or so for a monitor that does offer these features.

A composite color monitor will provide your Commodore with the best possible video image. Only by using a high-resolution color monitor can you truly appreciate your Commodore's excellent colors and graphics capabilities. This especially holds true if you own one of Commodore's newest computers, the C-16 or the Plus/4, as they both offer 128-color capability.

In regard to signals: The color-

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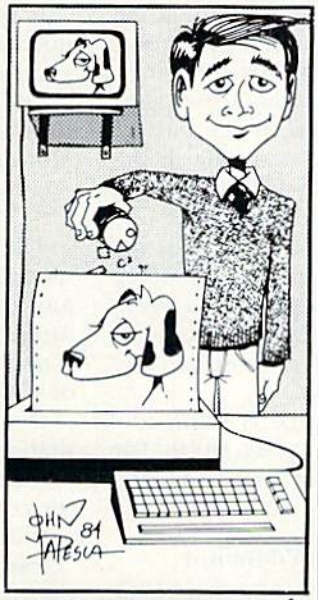

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CARDCO MT/1 MONITOR TUNER

Cardco, Inc. has just released an add-on tuner, for composite monitors, that will enable you to watch television on your monitor!

The MT/1 is color-coordinated to match the Commodore 1702 color monitor, and it carries the usual Cardco lifetime guarantee to the original owner. The suggested list price (as of this writing) is $199.95.

The MT/1 comes with its own wireless remote-control unit. Hooking it up to your monitor is simple, as there are only three connections to be made: antenna, video and audio.

The antenna connection uses the familiar screw-on coax-type connector, while the video and audio ports use standard RCA jacks.

Another feature of the MT/1 is that it is ready to accept multiplex (stereo) broadcasts when the FCC gives clearance for this enhanced sound broadcast format.

A very convenient feature is the built-in power jack on the back of the MT/1. This allows you to plug the monitor into the tuner, rather than into a wall outlet. The advantage of using this setup is that the power to the monitor shuts off when you shut off the tuner.

The wireless remote-control unit is a compact, slim box with controls for channel selection, channel search up or down, volume, muting and on-off. The remote-control unit is powered by two AAA batteries, which should last for over one year with average use.

The MT/1's large LED indicators for channels can easily be read from across the room. Additionally, the unit is cable-ready, and there is a channel-conversion chart on the back of the remote unit.

The MT/1 offers an affordable modification to your high-resolution monitor. Some of you might prefer this setup to a color TV, as it provides a clearer picture.

composite signal may be combined and fed into the monitor with one cable, or it can be further defined into the chroma and luma signals mentioned earlier. While the combined signal is much better than that on a TV set, the defined chroma and luma setup is better yet.

The best of the composite color monitors will provide for combined composite video input or separate chroma and luma input, with a switch to select the mode. In either case, the audio signal should always be carried through its own cable.

Concerning size, is bigger better? Bear in mind that you'll probably be spending a lot of time staring at this screen, so be sure that you get one that can be comfortably viewed. I suggest a minimum of ten inches diagonally; larger, if you can afford it (most monitors are 12 or 13 inches).

What about the warranty? Remember that a monitor is really a high-performance TV screen without the tuner circuitry. Make sure that the manufacturer is willing to cover the unit for at least 90 days on parts and labor, as this is pretty much the industry standard. Also inquire about the serviceability of the unit; does the manufacturer offer servicing, or will you have to leave it in a repair shop for a few months while the parts are flown in from lower Tasmania? This is an important consideration that few buyers think about until the monitor develops a problem.

How to Decide?

Which one is best? This is a question you'll ultimately have to answer for yourself. The best way to decide is to compare the actual video displays of those monitors that interest you. If the store has a Commodore 64 hooked up, you may be able to use it for your comparisons.

It's a good idea to bring along software that you've used a lot, so you'll have a familiar image on which to base your comparison. Another aid in making your selection is the chart included with this article (see Table 1), which gives specifications for the various models.

Ultimately, however, your own eyes should be the judge, since they're going to have to live with your decisions.

I've been asked a number of times what I use for my own applications. I have one Commodore Model 1701 and two Model 1702 monitors in my setup. My choice was a fairly straightforward one, based on these factors: their screens are comfortably large; their color rendition and resolution are excellent; their inputs are switchable from combined composite video and audio to chroma, luma and audio; their warranty is standard; the color is compatible with my C-64; most of all, they're dependable.

The Commodore monitors in my studio are on for an average of 12 hours a day, often seven days a week. I have literally thousands of hours of use on them, and I've never had any trouble at all.

Oh, yes...the price is right, too! The local Kmart sells them for $259—a really good price for this much monitor!

The Combination TV/Monitor

With the growing popularity of component video systems, we're starting to see more and more combination television/monitors in the stores.

By means of a switch, these units can change from a television to a hires monitor that lets you animate sprites with your computer. While this does indeed give you the best possible means of using one video screen for two applications, it doesn't solve the problem of one person watching TV while another computes.

You can also watch TV on your monitor if you own a home video recorder. The VCR has its own built-in tuner and a pair of jacks for video-out and audio-out. If you connect these jacks to your monitor, you can use the monitor as a TV.

Of course, you'll need an antenna connected to the VCR tuner, but the output of these jacks is composite video, which, you'll remember, is the type of signal that the monitor can handle.

If you don't own a VCR or you're not interested in hooking it up to your monitor for TV reception, then check the sidebar on this article to find out more about Cardco's MT/1 Monitor Tuner unit.

The Chart

The accompanying chart (see Table 1) lists several of the most popular monitors with their important features. This chart isn't complete, but it provides a very good cross-section of what's available.

If you're interested in a monitor that isn't mentioned on this chart, you can still use the chart as a guide for comparing features and price.

I hope this article has given you a "clear picture" of what a monitor can do for you! R

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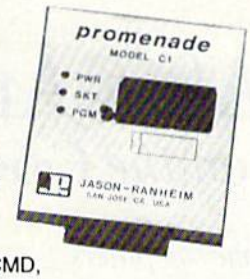

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One Little Word After Another

Word Processing on the C-64

Word processors for home computers have made many a writer's life far easier. Here are reviews of more then a dozen available for the Commodore 64.

By BILL GATES

Word processing is one of the most practical applications of the Commodore 64. Many people buy their C-64 system for the sole purpose of word processing. It is no wonder, then, that there are so many word processors on the market. This article will attempt to sort through the confusion and spotlight the better products. Also, it will indicate some products to avoid.

A Growing Phenomenon

Word processors make typewriters obsolete. That simple fact explains why the word processing phenomenon is taking over at the office and invading the home.

With a word processor, there is no such thing as correction fluid, ribbons or retyping. Entering and changing text is achieved through the editing process. The format of your printed document can be changed by pressing a few keys.

"How wonderful," you might be thinking, "but I never could learn all those complicated word processing commands." Put your fears aside. Welcome to the world of these user-friendly word processors. Many of these programs are so easy to learn that you can be off and running in fifteen minutes.

For Home and Office

Before you read the reviews, you should think about what you want in a word processor. The word processors reviewed here fall into two main categories: home use and professional use. Word processors for the home are usually easy to learn and relatively cheap, but they lack advanced features. Professional programs have the advanced features, but some of them may be priced out of your range.

The chart accompanying this article compares the features of the word processors reviewed. Many of these features are defined below. If you're a beginner, you should become familiar with them. The chart and definitions will give you a good background in word processing terminology, and they may help you to decide what you need in such a program.

Editing Features

Cursor Movement. All of the word processors reviewed here make use of the cursor keys on the Commodore keyboard. The up and down keys are used to scroll through the text. Most of the programs allow you to jump from one section of text to another. Some even allow movement by one word, sentence or paragraph at a time, which can speed up editing.

Deletion. The real joy of word processing is that typographical errors can be corrected instantly with the press of a key before anything is ever printed on paper.

Block delete is a command that can be used to eliminate parts of sentences or even entire paragraphs with a few keystrokes. With some word processors, you can recall the deleted text if you change your mind.

Insertion. To make an insertion in existing text, you simply start typing at the desired location, and the program moves the rest of the text over to make room for the entry.

Block Moves. While editing your text, you may come upon a sentence or paragraph that would fit better somewhere else. With a word processor, it is just a matter of a few keystrokes to "cut" out what you want to move and "paste" it where you want it. Block copy allows for the duplication of what you "cut" anywhere in the document, as many times as you please.

Word Wrap. With word wrap, a word that will not fit at the end of a line is automatically carried down to the next line. This makes editing much easier, since there are no confusing word fragments on the left and right margins of your text.

Search and Replace. This has become a standard feature among the current word processors. With a search-and-replace function, you can search for a particular word or phrase and replace it with a new word or phrase wherever it may appear in the document.

Tabs. The Tab function works the same way as on a typewriter. It makes it easy to line up columns for tables and charts.

Column Manipulation. This capability is found only in the most powerful word processors. Once you have defined a column (a vertical row of names, numbers, etc.), you can move it to another place in the document, indent it, save it to disk or alphabetize it.

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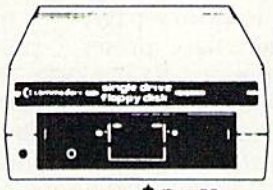

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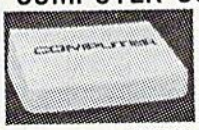

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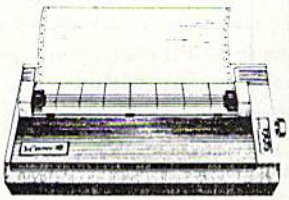

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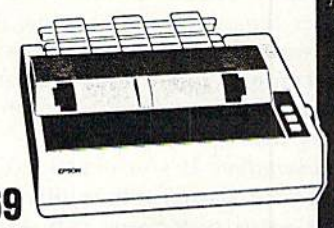

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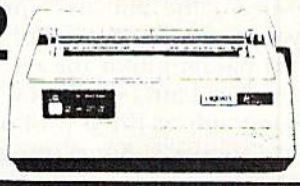

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Headers/Footers. When producing long documents, it is often desirable to have the chapter name or title on each page. Many word processors will do this for you automatically.

Automatic Pagination. Most of the programs reviewed will automatically place the page number at the top or bottom of the printed pages. If the word processor is capable of producing headers or footers, you can include the page number within them.

Justification. Everything on a typewriter is aligned on the left side. Some word processors can align the right side of the printed page as well, giving your document a more professional look.

Line Spacing. Single- and double-spacing has become a standard in these word processors. Some offer triple-spacing and more.

Centering. If you have ever had to manually center a line on a typewriter (i.e., count the letters, divide by two and count backwards from the center), you will appreciate the automatic centering capability of many word processors.

Indentation. If you neglected to indent your paragraphs while writing, most word processors can do it for you automatically when printing.

Widow and Orphan Control. When you come to the end of a printed page, you don't want to have one line of a new paragraph at the end of a page (an "orphan") or the last line of a paragraph at the top of a new page (a "widow"). Some programs can watch out for this and automatically prevent it from happening.

Change Pitch. Pitch refers to the number of characters per inch on your printed document. Many printers will allow you to condense or expand the spacing between letters by altering the pitch settings; some word processors allow you to access this capability.

Preview. This should be a standard feature, but is far from it. Preview allows you to examine the way the printed page will look before you print it, thus eliminating the need for a trial printing. Word processors accomplish this by one of three methods: by reducing the size of each character by one-half to make an 80-column preview screen; by keeping the normal 40 columns and using horizontal scrolling, or by having a pixel representation of the printed page (characters are reduced to dots), giving you a general idea of what it will look like.

Character Enhancements. If your printer is capable of producing italics, boldface, subscripts, superscripts and underlining, then you will want a word processor that is capable of utilizing these features.

Default Values. Instead of having to set all the printing format features every time you want to print a page, most of the programs have preset values that you can use.

Multiple Copies. If you want to have a hundred copies of the same document printed, this feature saves you from having to go through the Print command a hundred times.

Form Letters. While this is a task better suited to a database and word processor combination, some word processors have the ability to produce the same document with different names and addresses. This involves first creating a file of names and addresses, then a document with variable blocks, or holes, where the varying information is to be placed.

Force Page. This forces the next part of the document to appear on a new page.

File Size. An important aspect to compare among word processors is the amount of text that can be in memory at one time. When you reach the end of text memory, you have to start a new file.

Linking Files. This feature allows you to link and print separate files.

Hyphenation. The automatic word wrap may leave your right margin very ragged. Some word processors will allow you to hyphenate words. The only way you'll know if a word needs to be hyphenated is to either preview the document or do a trial print run.

Disk Commands. With most word processors, you can Catalog, Format, Scratch and Rename from within the program.

On to the Reviews

The 13 word processing programs reviewed here are all currently available for the Commodore 64. While there are several others on the market, the following programs provide a good sampling of what is available.

Bank Street Writer

Bank Street Writer (Broderbund Software) is characterized by ease of use. There are no complicated commands here; everything is menu driven. The documentation is good, but rather unnecessary, since the menus are self-explanatory. There is a tutorial included on the disk that takes you through the program step by step.

Editing. The problem with this program is that in order to move the cursor or execute any command, you must enter the Edit mode. If you make an error while entering text, you must leave the Write mode, enter the Edit mode, move the cursor, then re-enter the Write mode. While this is not a major problem, it does slow you down.

In the Edit mode, you work through menus at the top of the screen to reach all the commands. This approach ensures that you'll never forget a command, since they are all listed on the screen. This makes the program easy to learn, but it also makes accessing commands rather slow compared to some other programs.

Print Formatting. Lack of any form of print preview means that you have to do a trial print run to see what the document will look like. Bank Street Writer does have a rough-draft function for this purpose, but a preview function would have been preferable. The print formatting commands are all listed on a menu, so there aren't any imbedded printer commands to learn. The lack of character-enhancement capabilities will frustrate the owners of printers that include these features.

Summary. Bank Street Writer is best suited for home use. It has been extensively tested in the academic environment, and it is ideal for students who want to learn word processing. Those who need a faster, more powerful word processor can do better.

Cut & Paste

Cut & Paste (Electronic Arts) is a very easy-to-learn program. The packaging and manual have a great emphasis on style, making it a friendly introduction to word processing. The package includes a document disk, which is a nice extra. A reference card is also included.

Editing. Cut & Paste is awkward in a few areas. If you want to simply type over a misspelled word, you must first mark the word by pressing CTRL-A, then move the cursor to highlight the word, and then make the correction. The cut-and-paste procedure (block move), for which the program is named, is more easily accomplished. It is done by marking the text as explained before, and pressing CTRL-C (for cut). The text that was marked then goes into the buffer. Move the cursor to where you want the text in the buffer to appear, press CTRL-P for paste, and it's there. The tab function is preset to five

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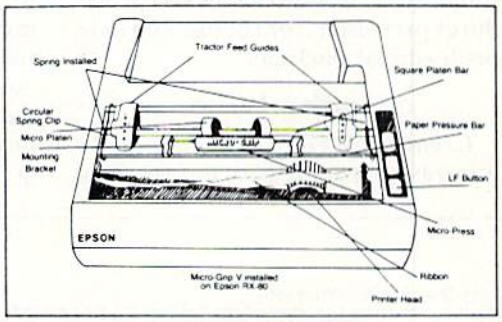

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spaces, and it cannot be changed.

Print Formatting. Cut & Paste is lacking in this area, for there is no print preview, character enhancements, justification or centering.

Summary. Cut & Paste is an easy-to-learn, friendly word processor. However, its lack of some important printing features and its limited, sometimes awkward editing procedures prevent it from being a serious, professional package.

Creative Writer

Creative Writer (Creative Software) is amazingly easy to learn and use. An extensive Help menu, containing all of the program's functions, can be accessed by pressing f3. The Main menu, from which you can select the printing, formatting and writing options, is clear and concise and can be accessed at any time by pressing f7.

Editing. Commands are executed by pressing f1 first, then making a minimum of keystrokes. For example, if you want to delete a paragraph, you press f1 to enter the Command mode, then the delete key for deletion, and then the P key, for paragraph. Creative Writer has a lot of features not found in many programs designed for home use (e.g., word wrap, tabs and widow- and orphan-control).

Print Formatting. Print previewing is done with a pixel representation of the printed page. Formatting is done through a simple, but complete, menu, thus eliminating confusing embedded commands. My only complaint is the lack of character enhancements—you can't underline, italicize or use other special features.

Summary. For home use, I recommend this program above all others. Creative Writer is easy to learn and use. It is powerful, yet clear and simple enough for the beginner.

Paperclip

Paperclip (Batteries Included) is one of the best professional word processors available for the Commodore 64. It has a multitude of features, yet it is still easy to use. Paperclip is dongle-protected, meaning that there is a plastic (dongle) plug that fits into the joystick port; this must be inserted to run the program. While this may seem like a nuisance, it means that the program itself is unprotected, allowing you to make backup copies.

Editing. Every command is accessed through the control key. An example of this program's thoroughness is its search-and-replace function. When you search for a word, you can search for the exact word, use wild cards (searching for "eve*" finds both "ever" and "even"), or match a letter combination at the beginning or end of a word. My only complaint with Paperclip is that it lacks word wrap, making text very difficult to read.

Print Formatting. The newest version of Paperclip, 64D, includes an 80-column print preview. On the disk are files for all the popular printers, which you can load quickly from inside the program. With this information, Paperclip has total printer control. Printer commands are all embedded, so there are no menus at all in Paperclip, just the Editing mode. The embedded commands are just as complete as the editing features.

Summary. Paperclip is an excellent professional word processor. I could not find anything that it lacked, except for word wrap. I recommend it highly for the professional category.

Homeword

Sierra's Homeword is extremely simple to learn. The package in-

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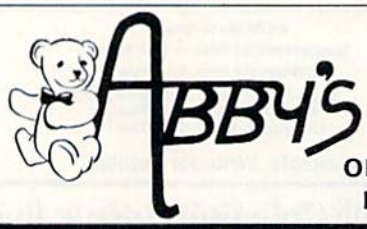

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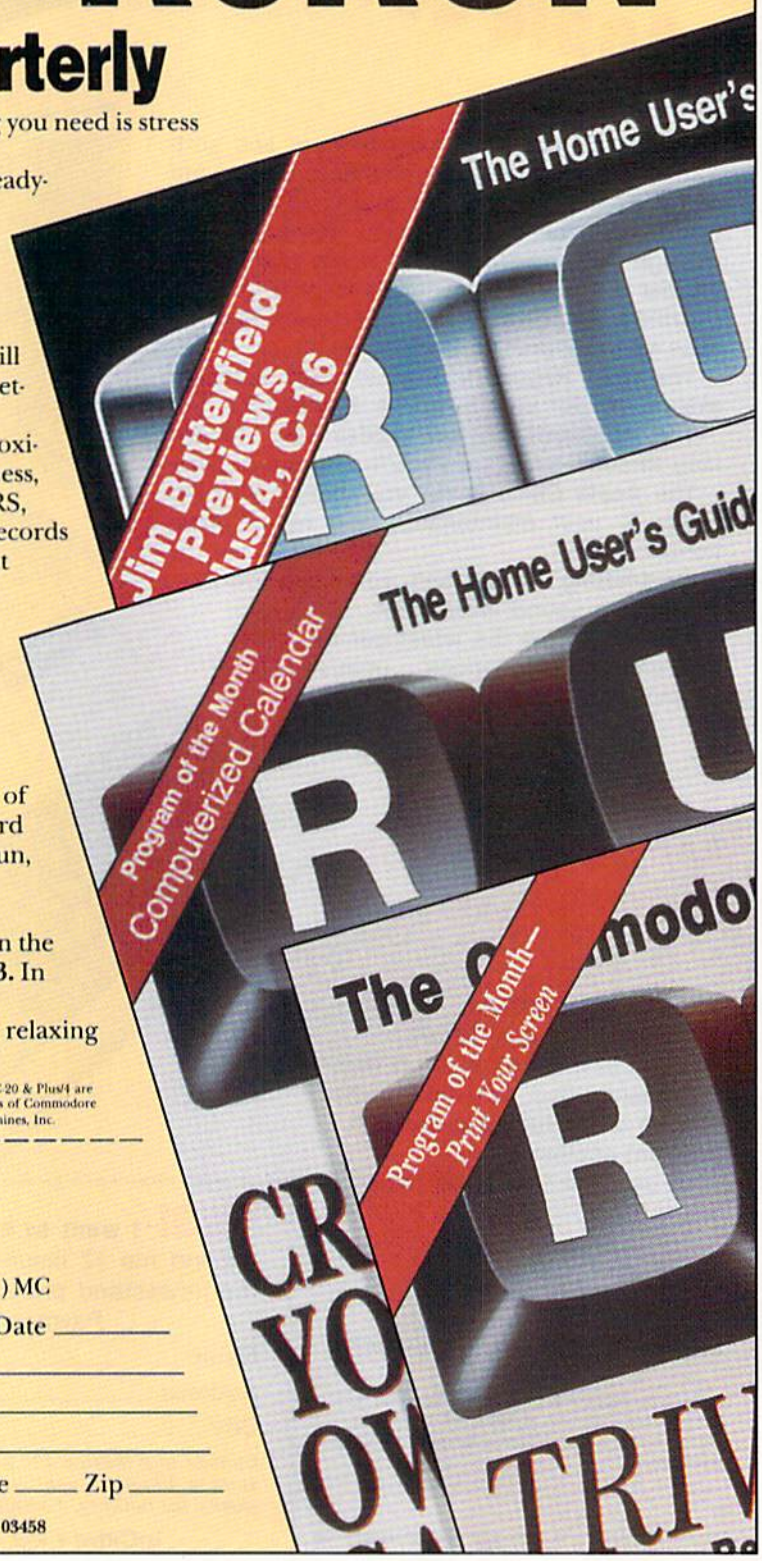
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cludes an audio cassette with a tutorial on how to use the program. This tutorial, however, is painfully slow and overly simplistic (assuming that you already know how to turn on your computer and put a disk in the drive). The package also includes a reference card that repeats the information contained in the five most important pages of the manual.

Editing. Homeword is menu-driven through icons. In other words, the menu cursor is a large square that you place around a little picture (icon) of what you want to do. If you want to load a file, move the cursor to the picture of the file cabinet. If you want to justify the document, put the cursor around the layout icon and press the return key; then, in the Layout menu, select the picture of the justified document.

Print Formatting. In the Editing mode, a pixel representation of the printed page appears in the lower right-hand corner of your screen. There is also an 80-column preview in the Print mode. When you enter the Print mode, the program loads more data from the disk. Switching between the Main menu and the Print menu is a time-consuming process. Only the basic formatting commands are found in Homeword.

Summary. Homeword is very easy to learn, but not so easy to use. If you're a novice with a slight case of computerphobia, Homeword will serve as a painless introduction to word processing. However, users who need a sophisticated word processor may find this one to be too slow to suit their needs.

Blitztext

Blitztext (Elcomp Publishing) is a very confusing word processor with an equally confusing manual.

Editing. With virtually every other word processor on the market, you do not have to press the return key when you come to the end of a line. This is one of the joys of word processing that Blitztext has left out.

Print Formatting. Printing a document is a good example of the confusion and inconvenience involved with using Blitztext. To print your text, you press CTRL-A, type "M47", and then press CTRL-A twice. Makes a lot of sense, doesn't it?

Summary. Blitztext lacks any redeeming qualities, and I see no purpose in considering it, even for occasional home use.

Word Writer

Word Writer (Timeworks, Inc.) is another good, but not outstanding, word processor for home use. It comes with two keyboard overlays, to be placed above the numbers row and next to the function keys. These overlays are the backbone of the program. The documentation only briefly explains the use of each function. Half of the manual is dedicated to the use of Data Manager, Timeworks' database, in conjunction with Word Writer.

Editing. All the commands are accessed by a combination of the Commodore or control key and a key on the top row of the keyboard. Block moves are done by marking the beginning of the block with Commodore-1, the end of the block with Commodore-2 and moving or copying it to another location in the document with Commodore-3. Inserting text is not automatic (there is no Insert mode), so the only way to insert text is by first inserting lines and later closing up the gaps by using the delete key.

Print Formatting. Only the basic printing features are found in Word

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Writer—there are no preview, character enhancement or any other advanced features.

Summary. Word Writer would be much too confusing for a beginner, especially with the poor manual. It lacks printing features, and it can be difficult to use; it has little to offer compared with some of the others in the home use category.

Totl.Writer

Totl.Writer (Totl Software, Inc.), unlike its predecessor, Totl.Text 2.6, ranks among the professional word processors. It has an extensive array of features. A complete Help menu can be accessed by the press of a function key.

Editing. Cursor movement can be done by word, sentence or paragraph by pressing CTRL-W, CTRL-S or CTRL-P, respectively. Block moves involve a long series of prompts. To delete a block, you first press f8 to get at the block commands, then press D (for delete). Then you are prompted to move the cursor to the beginning of the text to be deleted and press the return key, then to move to the end of the block and press the return key again. Then you are asked if you *really* want to delete the block. (Would you have gone through all that if you weren't serious?) Block copies are even more tedious; you are prompted three times to see if it is all right to go on.

Print Formatting. Totl.Writer has an enormous list of formatting capabilities. All commands are embedded. One feature that I found in no other word processor was true embedded footnoting. The program automatically places the footnote at the bottom of the page where the footnoted passage occurs.

Summary. Totl.Writer is a very impressive program and well worth considering for professional use.

WordPro 64

WordPro 64 (Pro-Line Software, Ltd.) is an excellent professional word processor with an identity crisis. The official name of this program is currently being decided in court, but I will use WordPro 64 for this review. Whatever you want to call it, this word processor has a myriad of features and is easy to use. The documentation is a little tough to follow at times, but it covers the program adequately.

Editing. Block moves are done through a combination of the Commodore key and another key that represents that particular function. For example, Commodore-D enters the Block Delete command. Pressing W, S or P highlights a word, sentence or paragraph, respectively. Then, press the return key and the highlighted text is deleted. The scrolling speed of the cursor up and down keys can be increased by first pressing f1.

Print Formatting. This is where WordPro 64 really shines. Print preview can be done either by 40-column horizontal scrolling or by pixel representation. Extensive printer files on disk are utilized to take full advantage of your printer. The formatting commands are embedded, and they're very thorough. A header or footer can appear on the left, middle or right side of the printed page.

WordPro 64 can also produce double columns. (I found this feature on only one other word processor—CGRS Microtech's Copy-Writer. However, WordPro 64 costs less and does more.) Double columns on a printed page would be suitable for newsletters, pamphlets and brochures. It is utilized by an embedded command (dc) followed by the value of the column width.

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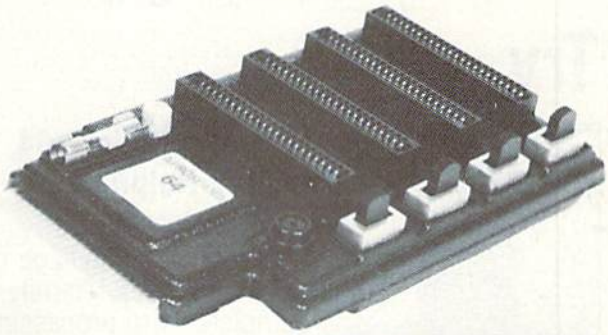

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this program is proportional spacing between letters. Quite a few printers are capable of this, and WordPro 64 will allow you to access it.

Summary. WordPro 64 rivals the best of the professional word processors, and I would rate it a "best buy." It has good editing features and an incredible list of printing features.

Word Commander 64

Word Commander 64 (MMG Micro Software) is a rather run-of-the-mill word processor for home use. It is not very friendly, nor is it easy to learn. You must first make a printer file through Basic (on disk) from outside the program. This could be disastrous if you are not familiar with Basic, and the poor documentation doesn't make it any easier.

Editing. While Word Commander 64 has many features, the editing commands are not easy to execute. Blocks are deleted, moved or copied by first marking them with Commodore-X at both ends (the text does not become highlighted), and then pressing CTRL-K to delete the text.

Print Formatting. Preview is done by horizontal scrolling, which takes away from text memory. All printer commands are embedded.

Summary. This is a rather mediocre word processor. Word Commander 64 is not a bad program, but there are better ones on the market for the same price.

Textomat 64

Abacus Software's Textomat 64 is a new, completely menu-driven word processor. You reach almost every editing command through an extensive series of menus. This approach will enable you to learn Textomat 64 in a very short time, but it may become rather tedious to continually wade through all the menus. The documentation is very thorough and easy to read.

Editing. You can move through the text quickly by using cursor jumps (by the word). Pressing f3 moves the cursor forward one word; pressing f4 moves it backward one word. This is much faster than just using the cursor-right key to move across a line.

A major problem with Textomat is really a simple thing—the delete key. Unless you type perfectly, you are going to make errors. Correcting typos should be as simple as pressing the delete key. You cannot do this with Textomat 64. The delete key deletes the character under the cursor, not the character immediately to the left of it. Therefore, you must back up using the cursor-left key and then delete the error. I found that this slowed me down considerably while typing.

Block moves involve going through a series of menus, which is helpful at first, making it almost impossible to forget the command. However, once you learn it, you will wish that there were a faster way to do it. All the editing, printing and disk controls are accessed through these menus.

Print Formatting. Textomat 64 has print preview and most of the standard print-formatting capabilities. These features are controlled mainly through a format menu.

Summary. Textomat 64 is suited for home use, but it is too slow to meet the demands of professionals.

Copy-Writer

Copy-Writer (CGRS Microtech) is a program that might scare a beginner away from word processing. Before you can use Copy-Writer, you must create a new version of the program, customizing it for your particular printer—a process I found quite confusing. The documentation,

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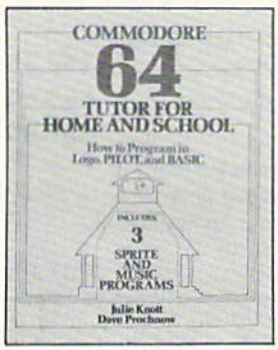

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which came to me unbound, is not much help.

Editing. Editing capabilities are minimal with Copy-Writer. The cursor disappears when it is moved, making editing unnecessarily confusing. There's no Insert mode; you're limited to the insert key.

Block moves are accomplished by deleting the text, character by character, into a buffer, and then dumping the buffer at the appropriate spot. All commands are entered on a separate prompt line at the bottom of the screen. To search for a word, you press the run/stop key to enter the prompt line, then type c/word/ and press the return key. As with Textomat 64, the delete key does not work as it does in Basic, which means that correcting errors can be a tedious process.

Print Formatting. CGRS Microtech's advertising for Copy-Writer emphasizes its double-column capability. This means the program can produce two columns on the same page without negative line feeds (the printer moving the paper backward). This is an impressive feature. All the other standard printing features are also included.

Summary. Copy-Writer's best feature is its double-column capability. However, if you really need double columns, then I recommend WordPro 64.

Fleet System 2

Fleet System 2 (Professional Software, Inc.) is a brand-new professional word processor from the makers of WordPro 3 Plus, one of the best-selling programs for the C-64. With this reputation behind it,

	Bank Street Writer	Cut & Paste	Creative Writer	Paperclip	Homeword	Blitztext	Word Writer	Totl.Writer	WordPro 64	Word Commander 64	Textomat 64	Copy-Writer	Fleet System 2
Editing features													
Move Cursor by word					✓	✓		✓			✓		
by sentence								✓					
by paragraph								✓					
by screen	✓	✓	✓	✓	✓		✓	✓		✓	✓	✓	
to beginning	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
to end	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	
Delete by word			✓	✓		✓	✓		✓				✓
by sentence			✓	✓					✓				✓
by paragraph			✓						✓				
by line		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Block delete	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓
Recall deletion	✓				✓	✓			✓			✓	
Insert key			✓	✓			✓	✓	✓			✓	✓
Insert mode			✓	✓				✓	✓		✓		✓
Automatic	✓	✓			✓	✓				✓			
Block Move	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Block Copy		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Word Wrap	✓	✓	✓		✓		✓	✓	✓	✓			
Search and Replace	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Tabs		✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓
Column Manipulation				✓				✓					✓

you would expect Fleet System 2 to be something special. It is.

Fleet System 2 is a very professional, easy-to-use program. It includes a fast, 70,000-word spelling checker on the back side of the disk. Unfortunately, the documentation is not as good as it could be. A reference card is also included in the package.

Editing. Fleet System 2 is almost exactly like Paperclip in terms of editing commands. In fact, I found it hard to make a distinction between the two programs. However, Fleet System 2 makes better use of the function keys, which are used to enter the Insert and Shift Lock modes.

Deleting a block of text involves pressing f1, then D (for delete), and then W or S to highlight words or sentences. Pressing the return key then deletes the highlighted text. One thing that I dislike about Fleet System 2 is that moving and copying blocks can only be done by entire screen lines, not by words or sentences.

Print Formatting. Fleet System 2 has all the formatting commands that you'd expect in a professional word processor. All the commands are embedded in the text. Again, it is difficult to distinguish between this program and Paperclip.

Summary. Fleet System 2 is an excellent word processor with a fast spelling checker. If you are looking for a professional program, you should definitely consider this one. R

Address all author correspondence to Bill Gates, 1330 Lomay Place, Pasadena, CA 91103.

	Bank Street Writer	Cut & Paste	Creative Writer	Paperclip	Homeword	Blitztext	Word Writer	Totl.Writer	WordPro 64	Word Commander 64	Textomat 64	Copy-Writer	Fleet System 2
Print Formatting													
Print Preview			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Margin Control	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Headers	✓	✓	✓	✓	✓			✓	✓	✓	✓	✓	✓
Footers			✓	✓	✓			✓	✓	✓	✓	✓	✓
Pagination	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓
Justification			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Centering	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Line Spacing	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Widow/Orphan Control		✓	✓									✓	
Indentation	✓	✓		✓	✓	✓	✓	✓	✓				✓
Multiple Copies	✓	✓	✓	✓			✓	✓	✓		✓		✓
Force Page		✓	✓	✓	✓	✓		✓	✓	✓	✓		✓
Hyphenation		✓		✓			✓	✓	✓				✓
Change Pitch				✓		✓[1]	✓[1]	✓	✓	✓	✓	✓[1]	✓
Underlining				✓	✓	✓[1]	✓[1]	✓	✓	✓	✓[1]	✓	✓
Boldface				✓	✓	✓[1]	✓[1]	✓	✓	✓	✓[1]	✓	✓
Italics				✓		✓[1]	✓[1]	✓	✓[1]	✓[1]	✓[1]	✓[1]	✓[1]
Default Values	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓

List of Manufacturers

Bank Street Writer
Broderbund Software
17 Paul Drive
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Blitztext
Elcomp Publishing
53 Redrock Lane
Pomona, CA 91766

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PO Box 102
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Textomat 64
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Totl.Writer
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Lopez Island, WA 98261

Word Commander 64
MMG Micro Software
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Marlboro, NJ 07746

WordPro 64
Pro-Line Software Ltd.
755 The Queensbury East, Unit 8
Mississauga, Ontario, Canada L4Y 4C5

Word Writer
Timeworks, Inc.
444 Lake Cook Road
Deerfield, IL 60015

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Other													
File Size (lines)	375	750	700	500	na	650	na	500	375	850	600	800	400
Form Letters				✓			✓		✓	✓	✓	✓	✓
Spelling Checker				✓[2]			✓	✓	✓[2]				✓
Linking Files	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Color Control	✓			✓			✓	✓	✓	✓	✓		✓
Help Screens			✓		✓			✓				✓	✓
Reference Card		✓			✓	✓				✓			✓
Keyboard Overlay							✓						
Disk Commands	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
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[2]Optional.
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RENUMBERER

A Remedy for Poor Planning

Here's a handy utility program that will take the drudgery out of renumbering your program's lines.

By ALEJANDRO A. KAPAUAN

Renumbering a program can be a time-consuming and tedious task, especially if your program contains several On...Goto and On...Gosub statements.

The disk-based Basic File Renumber program will read in a Basic program and rewrite the new, renumbered program. Unlike the renumbered commands of some programmer's aids, Basic File Renumber will automatically adjust all line numbers following statements such as Gosub, Goto and If...Then. Since this program renumbers from file to file, owners of VIC-20s with very limited memory can renumber even very large programs.

Besides renumbering, Basic File Renumber can also generate a cross reference of line numbers for your renumbered program. This cross reference provides a list of line numbers that are mentioned in other lines and shows where they occur.

You also might want to use Basic File Renumber to change the line numbers of existing programs or program modules so that you can easily merge them with your own programs (see John Olsen's article "Mix and Match Programs on the C-64" in *RUN*, April 1984).

Typing In the Program

The program is found in Listing 1. The DIM statement in line 100 allows the utility to renumber programs of up to 300 lines in length (I chose this number arbitrarily). As is, the program uses more than 3580 bytes, so if you're using an unexpanded VIC-20, reduce the value of MX in line 100 to about 150. An unexpanded VIC can renumber a program of 150 lines, but it won't have enough memory to generate the cross-reference listing.

If you use either a VIC with at least 8K expansion or a Commodore 64, you may leave the value of MX at 300. If you have sufficient memory, you may increase this number to renumber longer programs. To improve screen formatting of the cross-reference table, VIC owners can change the 40 in line 610 to 22.

Type in the program carefully. Pay attention to the semicolons in the Print# statements. Remember, you cannot use the Print statement's abbreviation (?) for the Print# statement. If you do, you'll get Syntax errors when you run the program.

To speed up disk reads, the data in lines 720 and 730 constitute a short machine language program, which is Poked into the cassette buffer. Be careful in entering the data. After typing and proofreading the program, save it to disk before you attempt to run it.

Using the Utility

To use Basic File Renumber, load it into your computer and run it. Insert into your disk drive the disk that contains the program you wish to renumber. The program will ask you for the name of the input file and the name you wish to give the renumbered file. It will then ask you for the starting line number and the increment by which to renumber the program. You will also be asked if you want a cross reference of the program.

The file will be scanned in a first pass to determine what line numbers it contains. On the second, slower pass, it will renumber your program's lines. The second pass will be slower because each line must be decoded to determine if it contains line number references that need to be changed. Also, both reads and writes to the disk will be taking place, which slows down the operation of the program.

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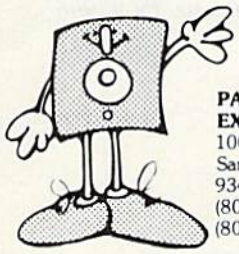

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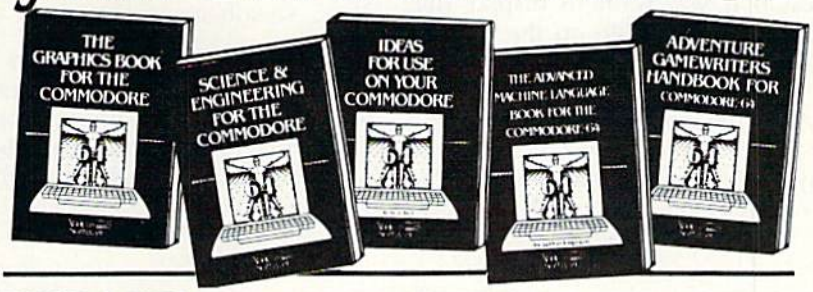
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When renumbering is complete and you have chosen the Cross Reference option, you will be prompted by the question:

CROSSREF(S/P/Q) ?

Press S if you want to display the cross-reference table on the screen, P if you want it printed on the printer or Q if you want to quit.

After the table is printed, you will be asked the question again. That way, you can print or display the table as often as you wish. Each line in the table consists of a line number and a list of line numbers that refer to it. Numbers that are preceded by an asterisk indicate that the reference is in the form of a Gosub or On...Gosub statement.

To check your renumbered program, load it into your computer and list it. If you run the utility program for the first time, and the renumbered program looks like a mess or won't list at all, then you've made an error in typing in Listing 1. Check your work, and make the necessary corrections to the program. You may then scratch the mangled renumbered file from your disk and try again. R

Address all author correspondence to Alejandro A. Kapauan, 141-6 Airport Road, West Lafayette, IN 47906.

Listing 1. *Basic File Renumber program for C-64 or VIC-20.*

```
10Ø MX=3ØØ:DIMLN(MX):PRINT"{SHFT CLR}{CTRL
    9}BASIC FILE RENUMBER":GOSUB7ØØ:Z$=CHR$
    (Ø)
11Ø CLOSE2:CLOSE3:CLOSE15:PRINT:INPUT"OLD P
    ROGRAM NAME";F1$
12Ø INPUT"NEW PROGRAM NAME";F2$:IFIC<>ØTHEN
    19Ø
13Ø INPUT"STARTING LINE NUMBER";SN
14Ø SN=INT(SN):IFSN<ØTHEN13Ø
15Ø INPUT"INCREMENT";IC
16Ø IC=INT(IC):IFIC<1THEN15Ø
17Ø INPUT"CROSS REFERENCE(Y/N)";RF$:IFRF$<>
    "Y"ANDRF$<>"N"THEN17Ø
18Ø IFRF$="Y"THENDIMCR$(MX)
19Ø PRINT"OPENING FILES":OPEN15,8,15
2ØØ PRINTF1$:OPEN2,8,2,"Ø:"+F1$+",P,R":GOSU
    B66Ø:IFER>ØTHEN11Ø
21Ø PRINTF2$:OPEN3,8,3,"Ø:"+F2$+",P,W":GOSU
    B66Ø:IFER>ØTHEN11Ø
22Ø PRINT"{CTRL 9}PASS 1":PRINT
23Ø GET#2,A$:GET#2,B$:NL=Ø:L1=ASC(A$+Z$)+25
    6*ASC(B$+Z$)
24Ø GET#2,A$:GET#2,B$:L2=ASC(A$+Z$)+256*ASC
    (B$+Z$):IFL2=ØTHEN29Ø
25Ø GET#2,A$:GET#2,B$:LN(NL)=ASC(A$+Z$)+256
    *ASC(B$+Z$)
26Ø PRINT"{CRSR UP}LINE";LN(NL):NL=NL+1
27Ø IFNL>=MXTHENPRINT"{CTRL 9}LINE TABLE OV
    ERFLOW":GOTO64Ø
28Ø POKE828,L2-L1-4:SYS829:L1=L2:GOTO24Ø
29Ø CLOSE2:OPEN2,8,2,"Ø:"+F1$+",P,R"
3ØØ PRINT"{CTRL 9}PASS 2":PRINT:GT=137:GS=1
    41:TH=167:QU=34:LK=-1
31Ø IFSN+NL*IC>63999THENPRINT"{CTRL 9}LINE
    NUMBER TOO BIG":GOTO64Ø
32Ø GET#2,A$:GET#2,B$:LL=Ø:L1=ASC(A$+Z$)+25
    6*ASC(B$+Z$):N1=L1
33Ø V=L1:GOSUB69Ø
34Ø GET#2,A$:GET#2,B$:L2=ASC(A$+Z$)+256*ASC
    (B$+Z$):IFL2=ØTHEN58Ø
35Ø GET#2,A$:GET#2,B$:CL=ASC(A$+Z$)+256*ASC
    (B$+Z$)
36Ø LK=LK+1:PRINT"{CRSR UP}LINE";CL
37Ø L=L2-L1-4:POKE828,L:SYS829
38Ø T2$="":I=851:L=L+I-1:QQ=Ø
39Ø C=PEEK(I):IFC=QUTHENQQ=NOTQQ
4ØØ IFGT>CORQQTHEN55Ø
41Ø IFGT<>CANDGS<>CANDTH<>CTHEN55Ø
42Ø TY$=" ":IFC=GSTHENTY$=" *"
43Ø T2$=T2$+CHR$(C):T3$="":I=I+1:NF=-1
44Ø C=PEEK(I)
45Ø IFC>47ANDC<58THENNF=Ø
46Ø IF(C>47ANDC<58)ORC=32THENT3$=T3$+CHR$(C
    ):I=I+1:GOTO44Ø
47Ø IFNFTHEN41Ø
48Ø J=Ø:TN=VAL(T3$):LN(NL)=TN
49Ø IFLN(J)<>TNTHENJ=J+1:GOTO49Ø
5ØØ IFJ>=NLTHENPRINT"{CTRL 9}NONEXISTENT:"T
    N:PRINT:TN=Ø:GOTO52Ø
51Ø TN=SN+IC*J
52Ø T3$=STR$(TN):T2$=T2$+MID$(T3$,2)
53Ø IFRF$="Y"THENCR$(J)=CR$(J)+TY$+MID$(STR
    $(SN+IC*LK),2)
54Ø IFC=44THEN43Ø
55Ø T2$=T2$+CHR$(C):I=I+1:IFI<=LTHEN39Ø
56Ø N1=N1+LEN(T2$)+4:V=N1:GOSUB69Ø:V=SN+IC*
    LL:GOSUB69Ø
57Ø PRINT#3,T2$;:LL=LL+1:L1=L2:GOTO34Ø
58Ø PRINT#3,Z$+Z$;
59Ø CLOSE2:CLOSE3:CLOSE15:IFRF$<>"Y"THEN64Ø
6ØØ INPUT"CROSSREF(S/P/Q)";Q$:IFQ$="Q"THEN6
    4Ø
61Ø IFQ$="S"THENWI=4Ø:OPEN4,3:GOSUB75Ø:CLOS
    E4:GOTO6ØØ
62Ø IFQ$="P"THENWI=8Ø:OPEN4,4:GOSUB75Ø:CLOS
    E4:GOTO6ØØ
63Ø GOTO6ØØ
64Ø CLOSE2:CLOSE3:CLOSE15:PRINT:PRINT"DONE"
65Ø END
66Ø INPUT#15,ER,E1$,E2,E3:IFER=ØTHENRETURN
67Ø PRINTER;E1$;E2;E3
68Ø RETURN
69Ø PRINT#3,CHR$(V-INT(V/256)*256);CHR$(INT
    (V/256));:RETURN
7ØØ S=Ø:FORI=829TO85Ø:READV:POKEI,V:S=S+V:N
    EXTI
71Ø IFS=3Ø36THENRETURN
72Ø PRINT"ERROR IN DATA STATEMENTS":END
73Ø DATA162,2,32,198,255,162,Ø,32,2Ø7,255,1
    57
74Ø DATA83,3,232,2Ø6,6Ø,3,2Ø8,244,76,2Ø4,25
    5
75Ø PRINT#4,"CROSS - REFERENCE FOR "F2$
76Ø PRINT#4," LINE{2 SPACEs}REFERENCES":BL$
    ="{8 SPACEs}"
77Ø FORI=ØTONL:IFCR$(I)=""THEN85Ø
78Ø J=2:IFI<>NLTHENN$=STR$(SN+IC*I)+BL$:PRI
    NT#4,LEFT$(N$,7)"-";:GOTO8ØØ
79Ø PRINT#4," ERRORS ";
8ØØ K=1
81Ø CH$=MID$(CR$(I),J,1):PRINT#4,CH$;:J=J+1
    :K=K+1:IFJ>LEN(CR$(I))THEN84Ø
82Ø IFK>WI-14ANDCH$=" "THENPRINT#4:PRINT#4,
    BL$;:GOTO8ØØ
83Ø GOTO81Ø
84Ø PRINT#4
85Ø NEXTI:RETURN
```

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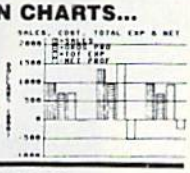

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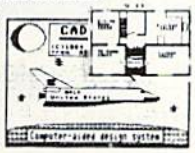

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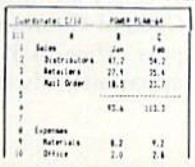

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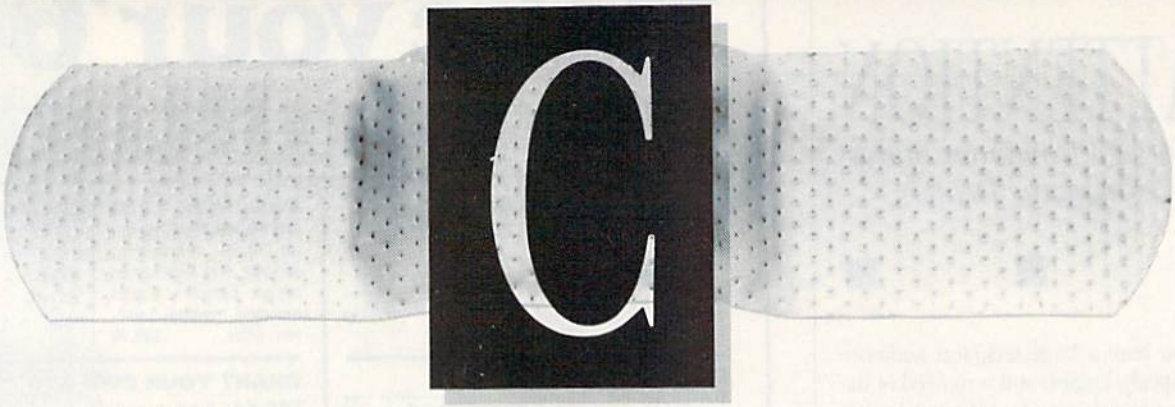

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and we will answer as many as possible in this column.

UPDATES

Update: There is a Radio Shack replacement ribbon for the VIC 1525 and 1515 printers. It is catalog number 26-1424, developed for the Radio Shack DMP-100 printer.

E.D. Shockley
Pompano Beach, FL

A: Thanks to all of you who discovered this. You can never have too many sources for printer ribbons.

Update: Regarding the lockup problems when using the 801 printer with the VIC, as reported in the November 1984 Commodore Clinic, there is a perfect fix. Right after turning on the VIC, type:

```
POKE 37160,0:POKE 37161,1
```

This completely solves the problem of the 801 locking up.

As you know, the VIC feeds data down the serial bus faster than the 64. This sometimes causes the 801 to get confused. The Pokes adjust the internal timers of the VIC to properly "handshake" with the 801.

This information comes from Dave Gzik, of Commodore's customer support office in Toronto, Ontario, who apparently discovered the fix.

Stephen Isaacs
Thornhill, Ontario
Canada

A: Great, and to think some people still don't even believe Commodore *has* a customer service department.

PROGRAMMING

Q: **Is there a way to put a hidden password in the title of a program on disk, so only people who know the password can load the program?**

Mike Leininger
Tipton, IN

A: Yes, some programs do this already. The technique is to include characters in the filename that aren't what they appear to be when printed. For instance, if the name of your program is "bell," you could protect it by saving it this way:

```
SAVE "0:
```

Then, before typing the name, hold down the shift key while you press the space bar. This makes a shifted-space character, also known as CHR$(160). It will look just like an ordinary space character when you type it in, but will change the appearance of that line of the disk directory in a way you'll have to see to believe—definitely different enough to fool most people about what the real name is. Finish the line as usual:

```
SAVE"0: BELL",8
```

Then, to load it again, you must remember to type a shifted rather than a regular space for the first character of the filename.

For still more excitement, try to put a delete character into the filename. This can be done from the keyboard in Insert mode, and will be a nice project for you.

Q: **I haven't been able to find anything on why and what you can do with disk drives #8 and #9. Can you explain, please? I'm in trouble!**

I changed device 8 to 9, then found I can't use it with several programs that recognize only 8. Commodore is no help—they sent me a one-line note: "Change it back!" The program to change the device number via software doesn't seem to work to make 9 into 8 again. Should I make the hardware change back? Why make the change in the first place?

Sarah Knutti
Bethesda, MD

A: Either change it back or add a single-pole single-throw switch across the solder pad you cut to make it device 9. The switch will let it be 8 or 9 as needed. But I can't imagine why you would want a 1541 to be anything other than device 8 if you don't own any other disk drives. As you noticed already, device 8 is standard.

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DEALER INQUIRIES INVITED

```
100 INPUT"FORMER DEVICE";F
110 INPUT"NEW DEVICE";N
120 OPEN 15,F,15
130 PRINT#15,"M-W"+CHR$(119)+
    CHR$(0)+CHR$(2)+CHR$(N+32)+
    CHR$(N+64)
140 CLOSE 15
```

If you have a 4040 or larger disk unit, change the first value in line 130 to CHR$(12) instead of CHR$(119).

The reason for changing a disk's device number is so you can use more than one disk unit connected to the same computer. Each device needs its own address (device number) to avoid confusion, just as each person needs an individual name.

With two disk drives connected at once and set to different device numbers, you have twice as much storage space immediately available. In practice, this usually means that one holds programs, while the other holds data files, or one makes backup copies of the other's files.

If you need this capability, consider buying a second disk drive or, better yet, a dual disk drive (one with two drives in a single cabinet).

Q: I have to open several relative files, but after opening the sixteenth file, I get a Disk Full error message. What am I doing wrong?

Jorge Romo Alexanderson
Tepepan, Mexico DF

A: I know of two ways to fill a disk. One is by creating more than 144 files, which you have *not* done, based on the track and sector dump you enclosed.

The other is by creating some files that are large enough to use up all the available space. This is apparently what you've done, although I can't be sure without seeing the disk.

Even one file can overload a disk if it is a relative file and you write to a large enough record number within it. If this has happened, either choose a smaller record size or use fewer records in your files.

Also remember that only one relative file can be open on the 1541 at any one time. To use more, access them one after the other, closing the last one before opening the next.

Q: Occasionally, when I attempt to format a disk on my 1541, my disk drive cranks for a minute or so and then the red light comes on, indicating an error. When I attempt to list the disk's directory, I receive only garbage. When I attempt to format the disk again, the drive sometimes produces the same error and sometimes formats the disk properly. Do you know why this occurs?

Frank Cox
Kindersley, SAS

A: You've just described a typical disk failure when formatting. Such a failure usually means either that the disk wasn't seated properly in the drive when you tried to format it or that the disk is faulty.

If you succeed in formatting the disk on your second try, after removing and inserting the disk again, you probably don't have anything to worry about. If a second try also fails, I would return the disk for a replacement (the disks I use are guaranteed for life).

However, you still have one more option: Use a bulk eraser (a big magnet) on the disk and then try to format it one more time. Friends who do this claim it often works.

Q: My 64 and 1541 lock up when I use the Validate command on a particular disk that is nearly full (five blocks free). After a few moments, the drive head movements stop and the drive runs indefinitely with the activity light on.

How can I correct this problem, and what is the safest way to get out of a lockup situation like this? The drive will not respond to any commands, including UJ.

Rod Combellick
Fairbanks, AK

A: Most likely there is something wrong with that disk. Immediately copy (not duplicate) all its files onto a freshly formatted disk. (This is easiest to do on a dual drive, if you know someone who has one.) When you do this, you may discover some files are ruined and can't be copied, or that they can be copied, but have been altered somehow.

After all the files have been rescued, you may reformat the original troublesome disk, which will probably be all right from then on. If not, get rid of it.

As for how to get out of a disk lockup, it depends on whether the drive is reading or writing. If it is only reading a disk, no harm is done by removing the disk even when the drive-activity light is on.

On the other hand, if the drive is writing, removing the disk or turning off the computer or drive could mean lost data. After waiting long enough to be sure the computer wasn't taking time out for garbage collection, and that the drive isn't simply busy on a long slow task, the safest recovery method is to open and then close the command channel by entering:

```
OPEN 15,8,15:CLOSE 15
```

This safely closes all disk files. If the drive ignores this command, you will have to reset the computer or remove the disk—but please don't turn off the drive with the disk still in it. Odds are you'll lose some data, but it's too late to avoid that. If the information you lose is very important, there are sometimes ways to restore it. People like me do that work for a fee.

Q: I have a problem saving part of a program as it is entered, for safety, and then saving more of it under the same name later. Is there a way to append data to a program without renaming it?

L.P. Thomason
Jacksonville, FL

A: Sorry, the Disk-append option only works on datafiles, not programs. You could use the Save With Replace option when saving revised versions of a program, but it's better not to erase old copies of uncompleted programs until the finished program is thoroughly tested. This is in case something goes wrong with the latest version, and you have to go back to an older version.

When I start a new program, I put it on a blank disk, saving up to several dozen versions of the program with a slightly larger number at the end of the name each time I save it. This

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continues until I finish the project. Then I copy the finished version to another disk. Finally, I reformat the project disk before using it on another project.

Q: How can I salvage a program I spent 12 hours working on? I have a monitor, so I can see the program in memory. But if I try to list, it starts out okay but later looks like garbage. When I get to certain points, the screen freaks out, turns black and makes little shapes in the corner. What is going on, and can I salvage some of this program by resetting something?

Gil Donbrava
San Antonio, TX

A: The easiest way to restore a program is from a backup copy you made before the disaster. When I am writing a new program, I save a copy to disk every 20 minutes, each with a different version number, ending up with a disk full of ever newer and more complete programs. I also save a final copy before I type RUN the first time. This avoids 99% of the problems you mention.

Unfortunately, it could easily take more than 12 hours to salvage your lost work. You should use a machine language monitor to be sure all the link pointers in the Basic program are pointing in their proper directions.

This is tedious work at best, and *not* for newcomers. If you know which line number is the first one that gives trouble and have a monitor that can convert its value into hex, you may be able to use some monitors' .H command to find that line quickly.

The link pointer is made up of the first two bytes in each line of Basic, and the first one is normally pointed to by locations $2B–2C in the VIC and 64. Once you've repaired the program, be sure it ends with three $00 bytes in a row and that locations $2D–2E point one location beyond the last $00. Then, save your work, return to Basic, type CLR, save again and try listing the result.

It isn't a job for the faint of heart. You can read more about what's going on in the "Inside and Beyond Basic" chapter of my book, *PET Personal Computer Guide*, from Osborne/McGraw-Hill.

Q: I would love to find a book that would explain in very simple terms how to write subscripts and superscripts on my Prowriter 8510.

Dick Wick Hall
Binghamton, NY

Q: I didn't know my Prowriter could do super/subscripts. If you could note the codes down for me, I would be most appreciative.

Fred Sepanek
Albany, NY

A: To print subscripts and superscripts on the C. Itoh Prowriter 8510 (and many other printers), you must be able to change the number of vertical lines per inch.

Normally, there are six printed lines per inch. But if you change the printer to print 18 lines per inch, you can divide each line of text into three lines in the printout—one for superscripts, one for ordinary text and one for subscripts. The following steps are needed:

- set the lines printed per inch to 18 instead of the usual 6
- print the superscript characters
- print the regular characters
- print the subscript characters
- set the lines printed per inch to 6 again

The way this procedure is accomplished will vary somewhat from one brand of printer to another. You can probably find the needed codes in your printer's manual.

When using the Prowriter 8510, the code to select this action is an escape code. These are codes that start with CHR$(27), the ASCII escape character, followed by one or more other CHR$( ) values. Here are the commands:

18 lines/inch:
CHR$(27) + CHR$(84) + CHR$(48) + CHR$(56)

6 lines/inch:
CHR$(27) + CHR$(84) + CHR$(50) + CHR$(52)

Here is an example program that does superscripts and subscripts on the 8510:

```
100 REM SUPER & SUBSCRIPT EXAMPLE
110 REM HELLO PRINTER (DEVICE 4)
120 OPEN 4,4
130 REM SET 18 LINES/INCH
140 PRINT#4,CHR$(27);CHR$(84);
    CHR$(48);CHR$(56);
150 REM PRINT LINES IN 3 PARTS
160 REM SUPERSCRIPT EXAMPLE
170 PRINT#4,"              2"
180 PRINT#4,"E = MC        "
190 PRINT#4,"              "
200 REM SUBSCRIPT EXAMPLE
210 PRINT#4,"              "
220 PRINT#4,"CO            "
230 PRINT#4,"              2"
240 REM RESTORE 6 LINES/INCH
250 PRINT#4,CHR$(27);CHR$(84);
    CHR$(50);CHR$(52);
260 REM GOODBYE PRINTER
270 CLOSE 4
```

One other complication could be your printer interface. Be sure it is set so as not to alter these codes on the way to the printer (usually called Transparent mode).

Now that you know how to do superscripts and subscripts, you can use the same approach to use the other special commands built into your printer. Just remember that, whereas most Basics control printers with Lprint commands, PET Basic uses Print# commands instead, as shown above.

SOFTWARE

Q: Is it better to buy commercial software on disk or cartridge? What are the advantages and disadvantages of each?

Dee Daviess
St. Louis, MO

A: Disks are more common, partly because they are usually about $5 cheaper than an equivalent cartridge, but also because they can be updated more easily and don't require changing any hardware connections when going from one program to another.

On the other hand, cartridges are far more durable than disk, cannot damage your disk drive and start instantly.

As copy-protection schemes have grown ever more elaborate and fragile, I have come to prefer cartridge versions of programs that cannot easily be copied, especially for use by kids and unskilled users.

On the other hand, constant insertion and removal of cartridges can eventually wear out the contacts on the cartridge port, so no one answer is perfect for everyone.

Q: I have a 64, a 1541 and a Gemini 10X printer. I have been able to customize the Armenian alphabet on the 64 and download it to the Gemini 10X. These programs will be used by a local church to send out their monthly mailings. Is there a word processor that will accept the customized alphabet?

David Handelsman
Philadelphia, PA

A: Paperclip 64, from Batteries Included (Toronto, Ontario), includes the ability to load custom character sets into the 64. You would still load the custom character set into the printer first, before starting Paper Clip.

Another possible solution is the WordPro 64, for the Commodore 64, from Pro Line Software, Mississauga, Ontario. It allows you to define ten special characters for both the screen and the printer.

While we're on the subject of churches, one of my recent projects has been helping friends complete a long-needed church package for the 64. It is scheduled for release this month. I'd be glad to send any church more information about it, and about a helpful user's group for churches, the Church Computer Users' Network.

Q: A good majority of the programs on the market are written in the U.S.A. Those of us in Canada find this quite frustrating. Some programs may take a year or longer before they hit the Canadian market, if they hit it at all. Surely there must be a way to obtain these programs from the States. Is there any way you know of, with a minimum of hassles, to purchase programs across the border?

John Bouchard
Gravenhurst, Ontario
Canada

A: Funny you should mention that. Sometimes I have the same feeling, except in my version all the good programs are written in Ontario, home of both word processing programs mentioned in the previous question. Maybe the grass really is greener on the other side!

As a Canadian once explained to me, the problem with getting new products to Canada quickly is that the population, and thus the market, is smaller than in the U.S. Also, products sold there must have bilingual boxes and manuals. A representative for a U.S. calculator maker reportedly claimed he could sell more calculators in Chicago alone than in all of Canada and avoid the hassle of changing the product.

It may not work quite the same way for you, but when I need to buy something from Canada, I either wait until my annual trip to Toronto, or order by mail. In both cases, I use a credit card to pay for the item. (Let the bank worry about exchange rates!)

Up to a cash value of $250 or so, customs duties on orders shipped into the U.S. may be paid at the nearest post office. Up to about $400 worth can be brought in each year duty-free by tourists returning from Canada. The duties on many computer products coming into the U.S. are quite low in any case.

The duty rates and customs procedures will differ in Canada, but you should be able to get details through your post office or by writing to the appropriate government agency. You could also find a dealer with a U.S. branch, such as Canadian Micro Distributors, in Milton, Ontario. Or visit scenic Niagara Falls, NY and buy direct.

Q: In testing a 1541 disk drive with the demo disk provided, I ran the performance test program and received a number of unit-is-failing-performance-test messages. A copy of the test printout is enclosed. Is the drive defective?

D.W. Shilling
Shoreham, NY

A: Probably not. As the message at the start of the performance test indicates, you are only supposed to run it on a "scratch" disk (a disk that does not contain any valuable information), not the Test/Demo disk itself. Fortunately, you left on the write-protect tab; if you hadn't, the whole disk would have been erased by the test. (I can't be positive about your procedure, but I ran the Test/Demo disk with the write-protect tab attached and exactly duplicated your test printout.)

Before worrying about the drive, try running the program again, using a new or reusable disk instead of the Test/Demo disk. The program called it a scratch disk because its contents, if any, can be safely scratched (erased). Be sure its write-protect notch is not covered by anything.

HARDWARE

Q: I'm having a problem with a recently purchased VIC-Modem 1600. I am unable to log onto CompuServe. The indicator light on the modem does not go on, and I am not getting the prompt from CompuServe. The modular phone I have has the dial built into the handset. Is there a problem with the modem?

Steve Herr
Chicago, IL

A: The problem is probably in your phone having its dial in the handset. Try using the modem with a standard Series 500 Western Electric desk phone, one with its smarts in the base and a detachable handset.

Get someone to assist you who has already called CompuServe and knows how to log on when the equipment works as it should. If you don't have that kind of phone available, it may be less expensive for you to trade in the 1600 on a 1650 Auto-Modem than to buy another phone.

Theoretically, you can also order a direct-connect cable for the 1600 from Commodore for about $15, but I've never actually seen one.

Q: I live in a rural area that does not have touch-tone telephone service. Is there any way to get on-line that is pulse dial and then emulate the tones to access computer service?

Rosalinda DeWitt
Seneca Falls, NY

A: I live in an area without tone dialing, too, but you're luckier than we are. Even pulse dialing fails sometimes here. If you need both pulse and tone dialing, some phones now have both methods built in.

This allows you to use pulse to dial out of town and then use tones to access All Net or other services that require it. One such phone is the Thinfone, from TeleConcepts, Inc. (22 Culbro Drive, West Hartford, CT 06110).

However, you won't need pulse plus tone dialing just to go on-line. The tones used by a telephone modem are different from those used to dial a touch-tone phone. As long as your phone system allows you to converse easily with persons in other towns, it is good enough to support the use of a modem.

If you have doubts about the quality of your service, use a 300-baud modem rather than the faster but more sensitive 1200-baud type. If having both tone and pulse dialing is important to you, some modems now include both in built-in autodialers.

Q: I have searched everywhere trying to find information about modems. At this time, I think my needs are for a modem that has 300 and 1200 baud. I want to be able to up-and download and communicate with another 64, a VIC and a TRS-80 CoCo. What kind of program would I need to achieve the above results?

Sharon Ireland
Merriman, NE

A: My own 300/1200-baud modem is the Signalman Mark XII, from Anchor Automation, the same company that makes the 1600 and 1650 modems for Commodore. As far as I know, it's still the least expensive 1200-baud modem able to emulate the popular Hayes Smart-Modem 1200. A friend who is an engineer in the industry pronounced it a bit weaker in design than his Hayes, but both work well.

To use either, you'll also need a VIC 1011-A RS-232 interface or equivalent. I rated and described two programs that you may use with this combination of equipment in my article on terminal programs in the September 1984 issue of *RUN*. They are VIDTEX, sold by CompuServe and Commodore, and VIP Term, from Softlaw (132 Aero Camino, Goleta, CA 93117).

Also keep an eye on Commodore. I expect a 1200-baud modem announcement from them soon.

Q: I don't understand the theory behind surge protectors. Why can't you plug an $8 surge suppressor into an outlet and a multiple outlet into the surge protector? Would this not accomplish the same thing as using the Lemon, Lime and Orange brand of surge suppressors?

Ronald Moore
Richmond, VA

A: Fancy surge protectors provide two services. First, they provide some protection against surges of moderately high voltage, just like your $8 version. Second, they also provide filtering of more ordinary variations in voltage, damping down deviations from the standard voltage and frequency. A water heater is a good analogy for the way this works.

A water heater's size allows it to hold enough water to give a comfortably warm shower. Even though cold water is constantly entering the tank as you bathe, the water doesn't normally leave the tank until it has been warmed. On the other hand, if the water were ever to boil, a separate emergency valve would open, to give steam an escape route and prevent an explosion.

In a surge protector, the surge protection is like the emergency valve, and the filtering is like the water tank.

Thus, you do get something extra when you spend more for fancy surge protectors. Whether you need that extra protection is another question. I have yet to hear of a piece of Commodore equipment failing for lack of a power-line filter, although several systems have been lost for lack of a simple surge protector.

One more thing—don't expect more of a surge protector than it can deliver. Nothing will protect your system against a lightning strike on nearby wiring except unplugging the computer completely.

Q: In principle, the 64 can make use of more memory than the old PETs. But I am beginning to think it doesn't do more. My PET gives me 31K free, and the 64 gives me 38K plus a 4K block of RAM that Basic does not use. Am I being kidded about the memory capacity of the 64, and if not, why can't we get more memory out of the PET using similar techniques?

J.G. Frajkor
Ottawa, Ontario
Canada

A: Both the PET and the 64 can address the same amount of memory at one time: 64K. The difference is that the PET came with less than 64K of RAM, and the 64 comes fully equipped. Both take some of the 64K for ROM, although in the 64's case, normally invisible RAM shares the addresses used by the ROM. The same is true of PETs equipped with the 8096 add-on memory board. In both cases, only machine language programs can take advantage of the added memory.

No one is fooling you about the 64's memory, but if you want to use all of it from Basic, you might be better off with a Plus/4. It uses special techniques to make all of its RAM available to Basic.

Q: I know the difference between RAM and ROM. I load a program from the Datassette into RAM. But what happens when I load a program in from a cartridge attached to the cartridge port? Does it go into RAM or what?

Tom Murphy
Maplewood, NJ

A: When a cartridge is installed, its ROM takes precedence over any RAM located in the same memory addresses. It doesn't have to load at all (because it is already connected to the machine at the correct addresses), as long as it contains a machine language program that the computer can obey directly from the cartridge's ROM.

A few cartridges contain Basic programs that relocate themselves inside the computer at start-up, and then run in the same RAM as other Basic programs. Such programs, however, are the exception rather than the rule.

Q: I find myself the owner of a Brother CE-50 electronic typewriter. After purchasing the proper interface and cables, I still find myself at a loss to know how to get it to work with my 64. Could you help me?

Mike LaMorte
Altoona, PA

A: The data sheet you enclosed implies you may use either a Centronics parallel or an RS-232 serial interface from the Brother to the Commodore. Not knowing which you have, if either, I'll try it both ways.

The most popular connection is via a serial bus to a Centronics parallel interface. These are available everywhere now, from several makers, and have been discussed here before.

The alternative is an RS-232 interface, normally connected to Commodore's VIC 1011-A interface via a suitable cable. It connects to the user port like a modem, and is also usable with RS-232 modems.

A third alternative, new on the market, is Cardco's new Cardprint-PS, which includes both a serial and a parallel connector in a single interface connected to the serial bus of the 64.

Assuming you go with a parallel interface, it appears you simply turn switch 1 of your Brother interface off and make sure your interface is getting power from somewhere. Some interfaces are able to draw power from the printer itself; others plug into the cassette port of the 64 or a wall outlet.

If you have an RS-232 serial interface instead, things are more complicated. Read about all the possible serial interface settings in your RS-232 interface manual. Then choose one and set the switches on the Brother to match. If, for example, you type

```
OPEN 2,2,0,CHR$(6)+CHR$(0)
```

you are asking for 300 baud, 8 bits, 1 stop bit, no parity and a 3-wire handshake. To set this on the Brother's switches, turn switches 1 and 3 on, switches 2, 4 and 5 off and ignore switch 6. Mind you, I'm basing these settings on your data sheet; I don't have a Brother printer myself. Let me know how it turns out. R

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Introducing Commodore 64 Machine Code

Ian Sinclair
Prentice-Hall, Inc.
PO Box 819
Englewood Cliffs, NJ 07632
Softcover, 146 pp., $12.95

This book aims to introduce, in very simple terms, machine language programming, as well as some of the basic inner workings of the Commodore 64. Aside from several flaws in the text, it succeeds in accomplishing these aims.

Author Ian Sinclair's target reader is the Commodore 64 owner with some experience in Basic programming, but little or no background in electronics or computer science. A large number of computer users fit this description, and many of them would like to get into machine language.

A first look at machine language programming reveals many new (and often confusing) concepts, with minimal explanations. What is needed is some very simple guidance, and that is exactly what *Introducing Commodore 64 Machine Code* offers. It starts at the most basic level, with a chapter explaining ROM, RAM, bits and bytes, in a non-technical way that avoids the childish tone of many similar presentations.

The second chapter explains how variables, strings and programs are stored in memory. While this isn't strictly a machine language subject, many machine language projects require an understanding of it, and such an introduction is a good start toward understanding machine language itself. The explanations here are brief, but after all, the book is just an introduction. Deeper understanding will come from working with the material presented and from reading more advanced works.

The next three chapters explore the 6502/6510 microprocessor. Included in these chapters are a step-by-step description of the processor's role in executing a simple program, an introduction to hexadecimal and descriptions of registers and addressing modes. The material is oriented toward those with no prior exposure to it, so the simple descriptions are limited to elementary matters. With a little effort, most readers should be able to follow them and gain some valuable insights.

Halfway through the book, the first machine language program is presented. A simple screen-fill program is shown in flowchart, Basic and machine language versions, and every aspect of the program is explained. It takes 17 pages to cover this one program, and it's well worth it.

Another 16 pages are devoted to expanding and improving the screen-fill program, and once again everything is clearly explained from several angles. Understanding machine language concepts requires painstaking analysis, and it's a joy to see it done so well in a book.

The final chapters show how an assembler is used to create a machine language program. The assembler described is Mikro, which is not widely available in this country, but the explanations apply to all assemblers. Five appendices and a brief index round out the book.

Unfortunately, editorial flaws may ruin this book for many readers. Introductory books must be free of errors and points of confusion; this one is not. Part of the problem is the author's British English and his use of unfamiliar words. Throughout the book, the word "denary" is used in place of decimal, which is a bit distracting. When Sinclair refers to outside material, his European viewpoint is also reflected. The products he recommends are from England and Belgium—you'll never find them at Waldenbooks.

More importantly, there are too many technical errors. We're asked to press the enter key, or to look for FC errors; we're referred to Push and Pull commands as well. None of these apply to the Commodore 64, and many readers will waste their time discovering this.

Some simple editing could have corrected these flaws. Also, Prentice-Hall's ads for this book are somewhat misleading. One of them claims that this book ". . . includes sophisticated applications in fast-moving graphics and games." Since the book's most sophisticated program is one that makes a beep when a key is pressed, with all the other programs being screen-fills, the advertisement is a bit misleading.

Introducing Commodore 64 Machine Code is full of excellent material for the beginning machine language programmer, but the technical and communicative flaws make it unnecessarily confusing. It covers its material adequately and in a well-organized way, but the book's many errors detract from its value as a beginner's tutorial.

Louis F. Sander
Pittsburgh, PA

Commodore 64 Fun and Games

Ron Jeffries, Glen Fisher and Brian Sawyer
Osborne/McGraw-Hill
2600 Tenth St.
Berkeley, CA 94710
Softcover, 182 pp., $11.95

This book is a collection of complete listings for 35 fun-and-games programs, written specifically and solely for the Commodore 64. In fact, none of the programs will run on the VIC-20 or the PET without major modifications.

The programs are written in Basic, and they take advantage of the special features and capabilities of the Commodore 64 (i.e., color, sound, sprites and character graphics). All you need to do is type a program listing into the computer (exactly as listed), and then follow the instructions for play, given in the introduction to each program.

One of the best things about the book is the complete, clear and concise explanations of how to read and type the program listings. This subject is treated very thoroughly, leaving no unanswered questions.

By typing in program listings from this book, the beginner will acquire a much better understanding of the graphics symbolism used on the Commodore 64. The book's tabular printout of the Commodore graphics symbols is superb, possibly the best that I've seen anywhere. This feature alone justifies the purchase price of the book.

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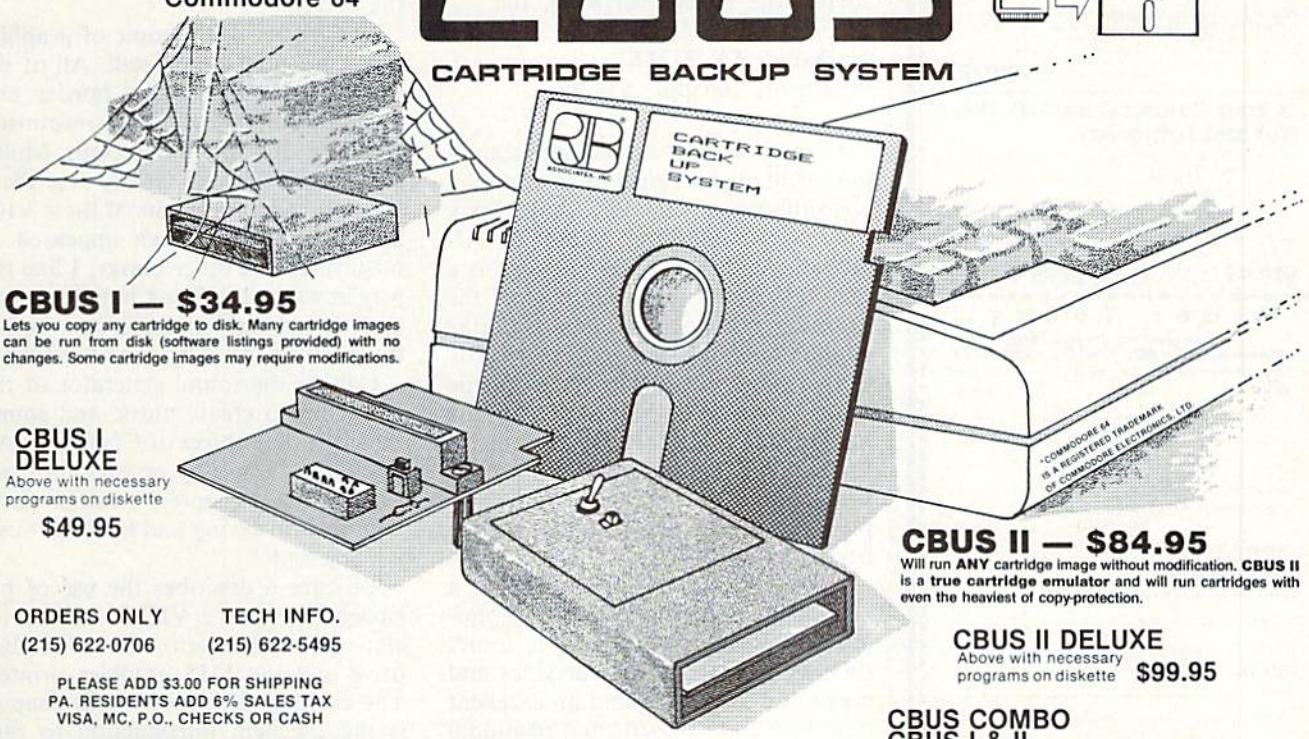

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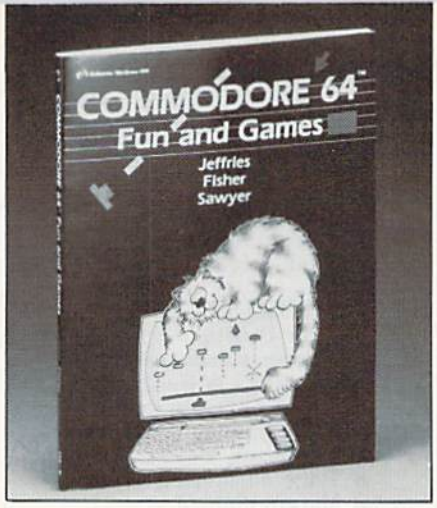

hours at the computer keyboard typing and saving the program listings, a disk containing all of the book's programs can be obtained. However, you'll still need the book for instructions on running the programs.

The first five programs in the book are called "tiny" programs. They are very short (from 14 to 71 lines), simple and entertaining. These short programs were designed to help you get into the swing of things.

The other thirty programs run the gamut, from computer versions of conventional games (e.g., BJACK, a version of Blackjack) to a very sophisticated game called Rescue, which challenges you to rescue your comrades on an alien planet while enemy attackers try to stop your mission.

I have typed and run several of these games, and I've had virtually no problems. None of these games will make the best-seller list, but they're still entertaining and worthwhile.

Gerald D. Gelvin
St. Simons Island, GA

VIC-20 Exposed

John Vander Reyden, ed.
Melbourne House Software, Inc.
347 Reedwood Drive
Nashville, TN 37217
Softcover, 166 pp., $14.95

If you have ever wasted time searching for an obscure piece of information concerning your VIC-20, then this book may help solve your problem. Although slender, *VIC-20 Exposed* is a one-stop source covering most of the important aspects of this popular computer. Unlike books that wearily explain every little detail in simplistic terms, *VIC-20 Exposed* gets to the heart of the matter, giving you the information you need in a short, precise form. As such, it serves best as a complete reference guide, rather than a beginner's tutorial.

The first three chapters provide a very detailed explanation of programming in Basic. In Chapter 1, topics such as screen editing, variables and arrays are discussed, and an excellent treatment of arithmetic and relational and logical operators is included. The chapter also features a superb introduction to the elements of computer science, discussing concepts such as bits, bytes and characters. Chapter 2 provides a concise, but very thorough, command summary for Basic, while Chapter 3 treats advanced techniques. (I almost never program in Basic, yet, by the time I finished these three chapters, I was anxious to fire up my VIC-20 and relearn this language!) In short, the full power of Basic is demonstrated in under 50 pages, and no stone is left unturned.

Incidentally, Chapter 3 has a number of ready-to use utilities to aid you in writing Basic programs. Among these goodies are an autonumber routine, a machine language merge and a "window lister" for easier screen editing. These, and other utilities in the chapter, add to the practical value of the book.

In Chapter 4, the topic of graphics is discussed in some detail. All of the usual subjects, such as border and background colors, high-resolution graphics and the mysterious Multicolor mode are very clearly described. Even though treatments of these VIC-20 features have often appeared in magazines and other books, I like the way in which this book handles them, since it not only explains how something works, but also *why* it works.

Getting the sound generator of the VIC chip to create music and sound effects is the subject of Chapter 5. Although nothing new or exciting is revealed in this chapter, a rather novel approach to saving and loading music is suggested.

Chapter 6 describes the use of peripherals with the VIC-20. These include the Datassette, the 1541 disk drive and the 1515 graphics printer. The exciting thing about this chapter is the excellent introduction to random access files on the 1541 disk drive. In fact, the whole subject of direct disk access (left unmentioned in

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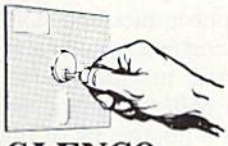

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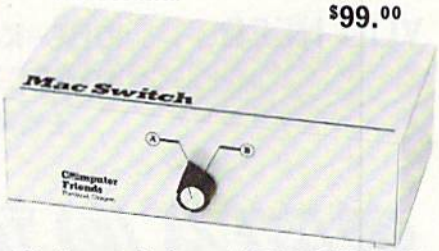

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most other books) is treated in such a way that a number of commands made sense to me for the first time. This is a popular subject, and yet very little practical information has found its way into the hands of Commodore owners. The authors are to be commended for including it. However, it's rather odd that the somewhat related (and simpler) topic of relative files isn't even mentioned!

In Chapter 7, you'll find out how to use the keyboard, joystick and paddles for games and other uses. There's enough information to get going, of course, but unfortunately, very little attention is paid to the VIAs internal to the VIC-20. It's knowledge of how the VIAs work that lets you use the keyboard, joystick and paddles effectively. Despite this shortcoming, the chapter does show you how to do simple things with these devices.

Chapter 9 is one of my favorites, since it gives you a chip-by-chip rundown of how the VIC-20 works. I've never seen this idea carried out in any other book, and the perspective it gives you is very valuable. By learning a little (even in general terms) about microcomputer architecture, your skill as a programmer will grow considerably. Exotic and unique programs will become possible if you learn to exploit some of the hidden hardware features of the VIC-20.

Chapter 10 takes on the popular subject of machine language programming. Since there isn't much that one can do in a single chapter, the authors have elected to provide a simple overview of the subject. You will need to fill in some of the details from other reference books. Nonetheless, you will find several very practical ideas presented here, such as loading and saving machine language programs, creating interrupt-driven subroutines and converting machine language routines to data statements. Also included in this chapter is a good 6502 command set summary (not just a photocopy of the manufacturer's data sheet).

The book concludes with a number of appendices. Included among these are the usual table of screen codes and ASCII characters, memory maps and background and border color codes. The last appendix includes a list of Basic (as opposed to Kernal) routines that you can use from within machine language. Routines to convert integers to floating point, floating point to integers, and all of the arithmetic and operator functions, are described. In all cases, the accompanying description tells you how to set up for the routine, the calling address and where to find the result.

Of course, a reference book is of no value unless you can find the information you need, quickly and conveniently. *VIC-20 Exposed* uses indenting, boldfacing and subtitles to help you find what you're looking for. The book has a good feel—it gives you what you need without a lot of excess. Also, the fine index guarantees that this is the first book you'll turn to when you need to find VIC-20 information in a hurry!

Thomas Henry
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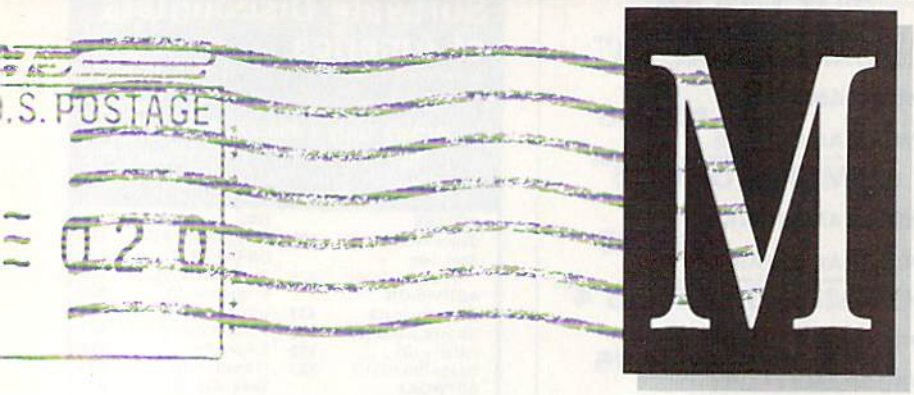


On Printers

I enjoyed "Selecting the Right Printer," by Jim Strasma in your January 1985 issue. I'd like to give you some comments on our choice for a typewriter/printer.

We use the Olivetti Praxis 39/41, which we obtained by mail order from DAK Industries. The major differences between the Praxis 39/41 and the Praxis 30, which you reviewed, are speed, price and interfacing.

The Praxis 39/41 runs at 12 cps (twice as fast). The typewriter/interface combination cost us $355 by mail order. The LCU 41B interface is Centronics-compatible, with a 2K buffer. It is also RS-232-compatible.

What came as a shock was that Olivetti chose to supply a connecting cable only for Commodore computers. In addition, DIP switches on the interface can be set so that the interface works with Commodore ASCII! The cable provided plugs into the user port, and Easy Script (or any other word processor that supports RS-232) can drive the combination.

This means that we have a daisy-wheel typewriter/printer without the additional $50 to $120 for the Centronics-style interface that is usually required with other printers. We feel we got a good buy for the money.

Noel Nyman
Seattle, WA

I think you missed a fairly good printer when you failed to include the Okimate 10 in your January 1985 article, "Selecting the Right Printer."

I am just learning to use my new Okimate 10, and so far, I am quite pleased with its performance. I use Commodore's "Magic Desk I" on their SX-64, and my printouts are via the Okimate 10. They all seem to work well together. With the proper screen-dump utilities, I can even print out graphics.

Robert F. Riggs
Titusville, FL

RUN *will be doing an in-depth review of the Okimate 10 in a future issue.*

Editors

Where's Commodore's Service?

I would like to concur wholeheartedly with the Albert H. Coya letter of August and the Warren W. McCurdy letter of December. Commodore's support of its customers in this part of the country is nonexistent.

I bought early, paid top dollar for quite a bit of equipment and now find myself deserted and forgotten. The store I bought from has quit handling Commodore items and no longer provides services; a source of parts 400 miles away has dried up; and I do not even know where to ask about replacing a defective on/off switch for my 8023 printer.

I have had my equipment for almost two years and it has been operational for maybe 20% of that time. I am disgusted with the Commodore approach to supporting its customers.

If there is a plan afoot for the unification of Commodore 64 owners, let me in on it, because that is apparently our only salvation.

Glen Tillitt
Wallowa, OR

I am writing to inform you and your readers that the Commodore computer plant in California has closed down. Some of you may already have known this, if you called a service number when your computer broke down. Some of us (*like me!*) found out when our computers were rejected by the current occupant of 390 Reed St., Santa Clara, CA 95050.

In order to get your computer repaired, you must send it freight prepaid, accompanied with a repair check to Commodore Computer Service Center, 1200 Wilson Drive, West Chester, PA 19380. To obtain the price of repair, you must call 1-215-431-9105.

If you bought your Commodore computer a couple of months ago or before, you received a warranty slip with a number for repair information and addresses of Commodore plants where you can send your computer to be repaired when it breaks down. *These addresses and the service number have all changed.*

The correct address and service number are listed above, so heed them well. I hope this information saves you some time and money, and I hope it saves you the useless weeks of waiting and the waste of shipping money that I went through.

Marc Salvatierra
Phoenix, AZ

Grateful for Language Improvement

I'd like to express my appreciation to you for Michael Buckley's Nimbots program (December 1984). Its accompanying assembly language listing is what interests me. My ability to pick up the low-level language has improved vastly, and I have *RUN* to thank for that improvement. It would be nice if this trend continued, as I'm sure it will.

Thomas J. Aliberti
Medford, MA

Alberta, Canada

The Medicine Hat Commodore User's Group would like to exchange newsletters and establish contacts with members of other user's groups. The club meets on the second and fourth Wednesday of each month at 7:30 PM, at the Medicine Hat College, Room N154.

For more information, write Medicine Hat Commodore User's Group, Box 764, Medicine Hat, Alberta, Canada T1A 7G7.

Decatur, IL

The Decatur Commodore Computer Club meets two times each month and currently has more than 75 members. For more information, contact Jim Tonias (president), 1368 W. Riverview, Decatur, IL 62521.

Fond du Lac, WI

The Fond du Lac Area Commodore User's Club meets every third Thursday of the month at 7:00 PM, at the Moraine Park Technical Institute (in Fond du Lac).

For more information, write Dick Lendl, 1504 Shelly Court, North Fond du Lac, WI 54935.

Southern New Hampshire

The Monadnock Commodore 64 Users can be contacted by writing RFD #1, Route 10, Winchester, NH 03470.

Richmond, VA

The Commodore 64 User's Group of Richmond, VA can be contacted through Robert S. Armstrong, Jr. (secretary), PO Box 9078, Richmond, VA 23225.

Allen Park, MI

If you live in the Allen Park, MI area and are interested in Commodore computing, you are invited to join the Downriver Commodore Group. For information, write Ron Marshall, 17029 Keppen, Allen Park, MI 48101, 313-274-2589.

Las Vegas, NV

The Silver State Commodore User's Group has been in existence for over a year. Although the group is not aimed specifically at one computer, most of the members are Commodore owners.

At the weekly meetings, members demonstrate software packages and teach Basic and machine language programming.

For more information, write Silver State Commodore User's Group, PO Box 81075, Las Vegas, NV 89180.

Topeka, KS

The Topeka Commodore User's Group holds its meetings on the last Tuesday of each month, with software and hardware demonstrations and discussions dealing with the various problems of the computer user, from beginner to advanced.

If interested, contact Robert F. Wayman, 7939 S. Topeka Blvd. #39, Wakarusa, KS 66546.

San Bernardino, CA

With more than 100 active members, the Commodore 64 Club is involved in a wide range of activities concerning the best uses of the C-64. Meetings are held on the first Thursday of each month.

For more information, write Carl Gardenas (president), 1804 N. Dundee, Highland, CA 92346, 714-864-4498.

Longview, TX

A non-profit organization serving members and computer users in the area, the Longview User's Group meets on the first and third Tuesday of each month.

The first meeting of the month covers general interest topics and the second meeting is held to allow special interest groups to exchange equipment and information. The group offers a public-domain library and publishes a monthly newsletter.

For more information, write Longview User's Group, PO Box 2504, Longview, TX 75606, or call Dorothy Metzler, 214-759-0699, or Joyce Pope, 214-777-4458.

West Indies

The Caribbean Commodore Computer Club was formed in November 1984 and is open to all residents of the islands of the Eastern Caribbean.

For information, contact Jim Lynch (president), PO Box 318, St. Johns, Antigua, West Indies, 809-462-4965.

Springfield, TN

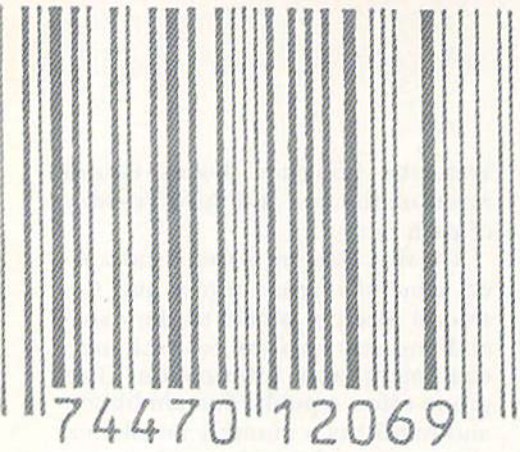
The Springfield Commodore Computer Club was recently formed. For information, contact Paul Bell, Route #1, Box 166, Springfield, TN 37172, 615-384-4050.

Rochester, NY

If you live in the Rochester, NY area, you are invited to join the Commodore User's Group of Rochester, which has more than 250 members.

Meetings are usually held on the last Wednesday of each month. A small membership fee entitles members to receive the club's monthly newsletter and make use of its public-domain library.

For more information, send a S.A.S.E. to Commodore User's Group of Rochester, PO Box 26514, Rochester, NY 14626.



Compiled by SHAWN LAFLAMME

Adventure Master

CBS Software (One Fawcett Place, Greenwich, CT 06836) has released Adventure Master for the C-64.

This two-disk program allows you to create your own adventures, as well as try out the three games included in the package. Adventure Master retails for $44.95.

Check Reader Service number 408.

Comtax

Milo Software, Inc. (PO Box 569, Jamaica Plain, MA 02130) has released the 1984 version of Comtax, a tax preparation program for the C-64.

Comtax compiles data for Forms 1040 and 2441 and Schedules A, B, C, D, E, G and W. It is available on disk or tape for $39.95. Annual updates cost $12.

Check Reader Service number 417.

Amazonian Adventure

Expedition Amazon is a fantasy role-playing game for the C-64, from Penguin Software (830 4th Ave., PO Box 311, Geneva, IL 60134).

You must lead your expedition deep into the Amazon rain forest to find the ruins of a fabled Inca citadel. The game is available on disk for $34.95.

Check Reader Service number 410.

Tax Planner

The Tax Command Planner is Practical Programs' (PO Box 93104, Milwaukee, WI 53203) newest addition to its line of tax preparation software.

The program is designed for year-end tax planning, and it allows you to experiment with various tax strategies. Tax Command Planner is available on disk for the C-64. Retail price is $49.95.

Check Reader Service number 426.

Investment Package

Programmed Press (2301 Baylis Ave., Elmont, NY 11003) has released its Investment and Statistical software package for the C-64, containing 50 programs for statistical forecasting and evaluating stocks, bonds, options, futures and foreign exchange.

The package is available on disk for $100. A handbook that lists and explains all 50 programs is available for $19.95.

Check Reader Service number 411.

National Communications System

PlayNet is a telecommunications system that allows C-64 users to establish on-line friendships and contacts throughout the U.S.

Playnet also provides bulletin boards on national and world events, arts and entertainment, sports and computers. The membership fee is under $30. Subscribers receive a system access disk, two game disks and a monthly newsletter. PlayNet, Inc., 200 Jordan Road, Troy, NY 12180.

Check Reader Service number 416.

Creative Adventures

Adventure Construction Set is a program that allows you to design graphic and text adventure games for one to four players.

Three adventure formats are provided: fantasy, mystery and science fiction. The program is available on disk for the C-64. Retail price is $50. Electronic Arts, 2755 Campus Drive, San Mateo, CA 94403.

Check Reader Service number 415.

Simple Data Management

Ramstar Consultants (1863 Sierra Alta Way, Monterey Park, CA 91754) has released the Ramstar Filing System, a database package for the C-64.

The program is intended for first-time database users and anyone who requires an easy-to-use filing system

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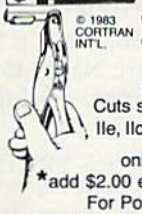

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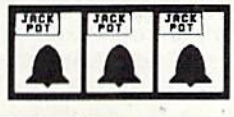

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for the home or small business. The Ramstar Filing System is available on disk for $35 (mail order only).

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Math Series

JMH Software of Minnesota, Inc. (7200 Hemlock Lane, Maple Grove, MN 55669) has released a Pre-Algebra series designed to support the secondary curriculum for pre-algebra.

This software is intended for the seventh grade and above and is compatible with many available textbooks. The disks are available for the C-64 and retail for $49.95 each.

Check Reader Service number 403.

Go Galactic

Infocom (55 Wheeler St., Cambridge, MA 02138) has released the Hitchhiker's Guide to the Galaxy, a text adventure game based on the book by the same name.

You are forced to flee your home and set out on a series of intergalactic adventures, hitching rides with passing spaceships. The package is available on disk for the C-64 and Plus/4 and retails for $39.95.

Check Reader Service number 405.

Monitor Your Calls

Input Systems, Inc. (15600 Palmetto Lake Drive, Miami, FL 33157) has released CAM-64, a software package designed to monitor multi-station telephone usage with the C-64.

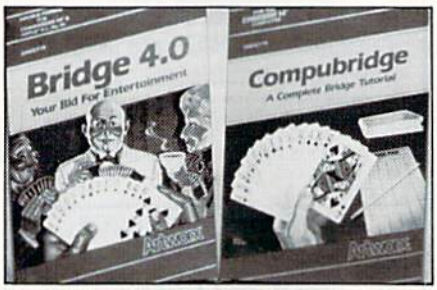
The CAM-64 system can be connected to the telephone-switching computer with an RS-232 interface. A permanent disk or hardcopy of records can be created for as many as 2500 calls per disk.The package is available for $295.00.

Check Reader Service number 406.

You Are There

Karateka is an action karate game from Broderbund Software (17 Paul Drive, San Rafael, CA 94903).

Karateka makes you the hero of your own movie, complete with characters, a story line, sound and animation, drawing you into the action of the game. Karateka is available on disk for the C-64 and has a retail price of $34.95.



Check Reader Service number 407.

Apple Emulator

Mimic Systems, Inc. (1112 Fort St., 6th Floor, Victoria, British Columbia, Canada V8V 4V2) has released the Spartan Apple Emulator.

The Spartan modular system allows the C-64 to use all standard hardware and software for the Apple II +, without losing any of the C-64's capabilities. The system consists of BUSS, CPU and DOS cards and has a retail price of $599.

Check Reader Service number 425.

MacMusic

MacMusic is a stand-alone software package that allows you to compose your own music on the C-64, using either a joystick or KoalaPad to draw the melody on the screen.

The MacMusic package is available on disk and retails for $49.95. Passport Music Software, 625 Miramontes St., Suite 103, Half Moon Bay, CA 94019.

Check Reader Service number 424.

Ant Attack

Quicksilva, Inc. (426 W. Nakoma, San Antonio, TX 78216) has announced the release of Ant Attack, an action game for the C-64.

You must rescue your lost love from the ants that have taken over a deserted city. Ant Attack is available on disk and retails for $29.95.

Check Reader Service number 418.

Play Better Bridge

Artworx Software Co., Inc. (150 North Main St., Fairport, NY 14450) has released Compubridge, a bridge tutorial program for the C-64.

Designed for the novice, Compubridge evaluates your actions, corrects mistakes or weak moves and suggests alternative strategies. It is available on disk for $24.95.

Check Reader Service number 414.

Beginning Arithmetic

The Sweet Shoppe is a mathematics program designed for children who are just learning to count and for those who are learning addition and subtraction.

It is available on disk for the C-64. Retail price is $39.95. Eric Software Publishing, 1713 Tulare St., Fresno, CA 93721.

Check Reader Service number 412.

The File Converter

The File Converter will allow you to transfer files from one database to another, as well as input data at an increased speed.

The program is available on disk for the C-64. Retail price is $39.95. Applied Technologies, Inc., Computer Products Division, Lyndon Way, Kittery, ME 03904.

Check Reader Service number 419.

Indiana Jones Challenge

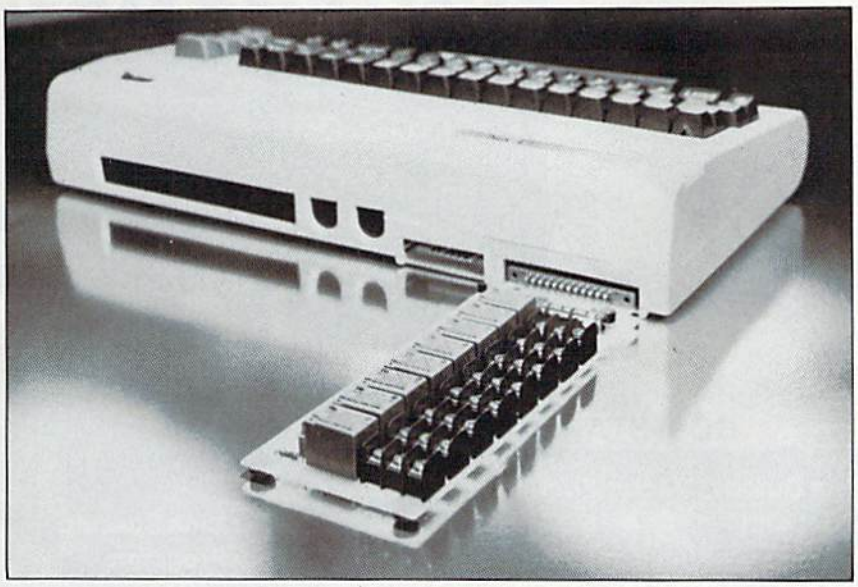
Mindscape, Inc. (3444 Dundee Road, Northbrook, IL 60062) has introduced Indiana Jones in the Lost Kingdom, an adventure game for the C-64.

You must rely on your own intuition, skill and logic to solve the problems in the adventure—rules are not included in the manual. The game is available on disk for a retail price of $29.95.

Check Reader Service number 423.

A Lesson in Logic

Logic Workout is an educational program that introduces to students, from the eighth grade to the college



level, classical logic and syllogisms. You can work with angle logic, picture/symbol logic and more.

The Logic Workout is available on disk for the C-64. Retail price is $34.95. Avant-Garde Publishing Corp., PO Box 30160, 1907 Garden Ave., Eugene, OR 97403.

Check Reader Service number 422.

■

Monty Plays Scrabble

Epyx, Inc. (1043 Kiel Court, Sunnyvale, CA 94089) has released Monty Plays Scrabble, a computer version of the popular word game.

The game is played just like the original board game, except that you do not need a human opponent. Monty Plays Scrabble is available on disk for the C-64 and retails for about $35.

Check Reader Service number 400.

■

MusicWare

Sequential Circuits, Inc. (3051 North First St., San Jose, CA 95134) has released the MusicWare line of software, which allows you to play, compose and print out music using the C-64 and a Sequential synthesizer keyboard.

The MusicWare programs have a retail price of up to $99 and are available on disk.

Check Reader Service number 421.

Save Energy

Powerport is an energy control device designed for home or business use, from Savergy, Inc. (1404 Webster Ave., Fort Collins, CO 80524).

The system can be plugged into the user port of either the VIC-20 or the C-64; it can regulate your heating, lighting and cooling systems. The device retails for under $100.

Check Reader Service number 404.

■

Imperium Galactum

Strategic Simulations (883 Stierlin Road, Bldg. A–200, Mountain View, CA 94043) has released Imperium Galactum, a strategy game for the C-64.

You can conquer the universe by creating your own legion of starships that range from explorers to powerful battleships. Imperium Galactum is available on disk for $39.95.

Check Reader Service number 409.

■

History Flash

Orbyte Software (PO Box 948, Waterbury, CT 06720) has released History Flash, a new addition to its ChallengWare Social Studies series.

History Flash covers 400 years of US history, from the days of Christopher Columbus to the present. The program is available on disk for the C-64 and retails for $29.95.

Check Reader Service number 420.

Move up to FORTH

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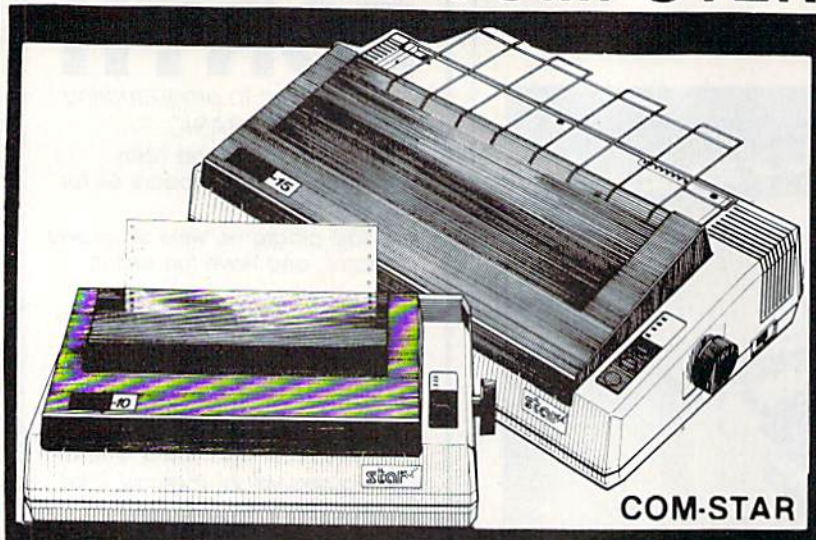

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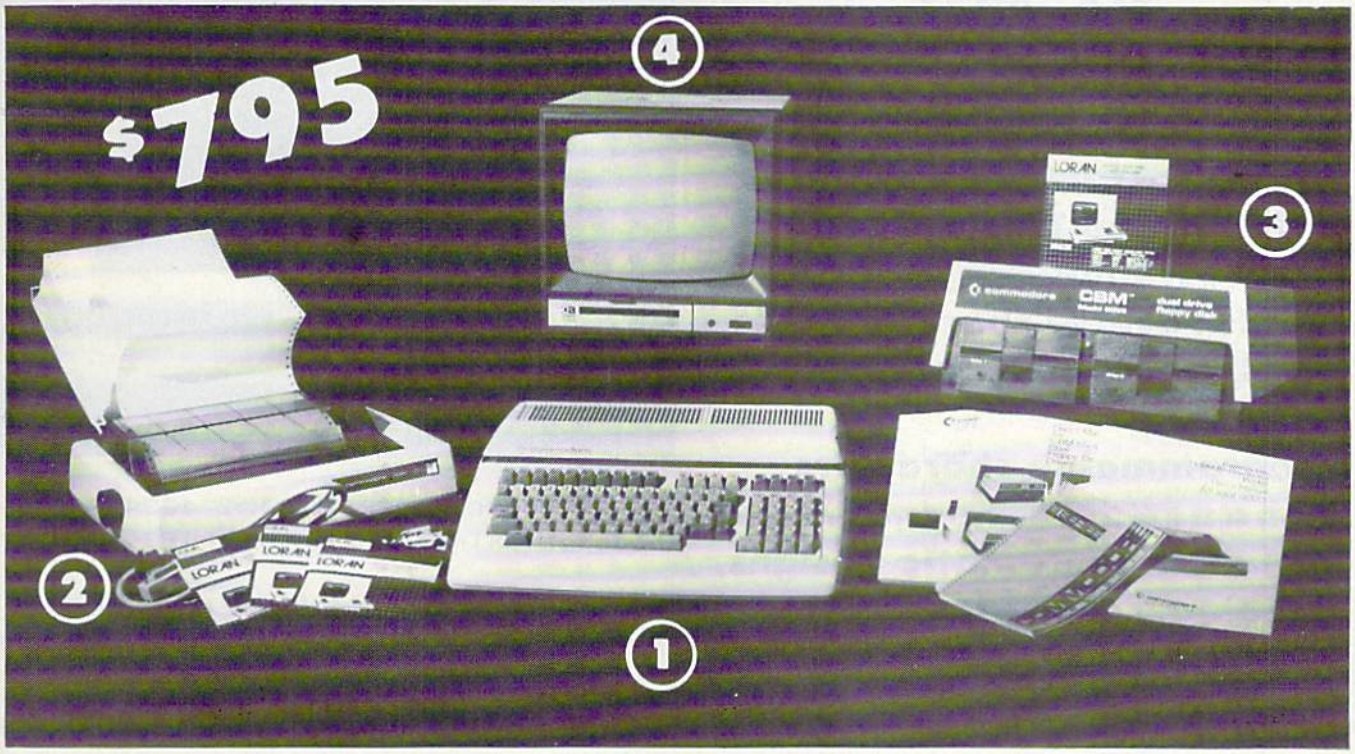

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No. 4023

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- Prints reverse characters
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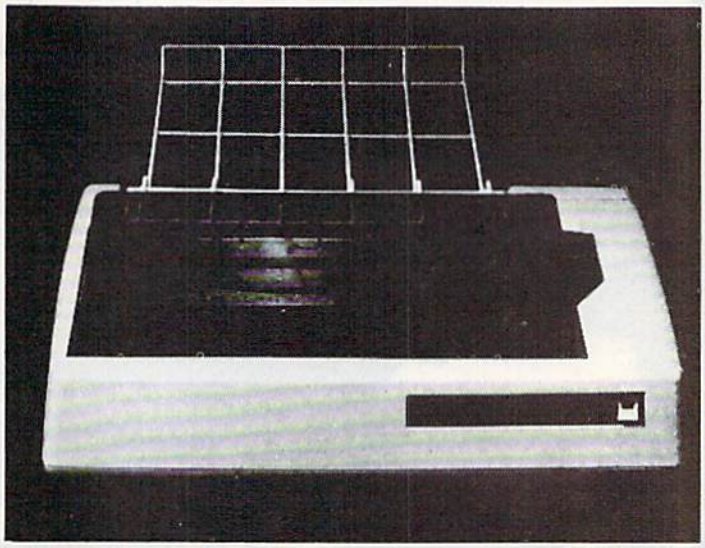

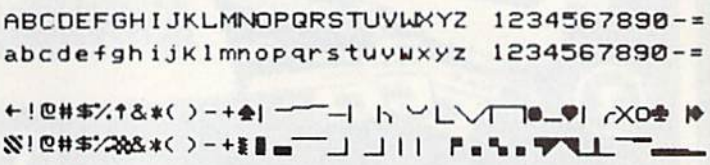

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SPECIFICATIONS

PRINTING METHOD
Serial Impact Dot Matrix

PRINT RATE
100 characters per second (CPS)

PRINT STYLE
Correspondence Quality

PRINT DIRECTION
Bi-directional

COLUMN CAPACITY
80

CHARACTER FONT
8 X 8

LINE SPACING
Programmable

CHARACTER SIZE
0.094" high, 0.08" wide

COPIES
3, including original

RIBBON TYPE
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RIBBON LIFE
1.2 million characters

RIBBON CARTRIDGE
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3" to 10" tractor or single sheet friction

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7.5 plus (0.5 X 2 sprocket margins)
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20,000 Word Dictionary	$24.95	$14.95	$10.00
Electronic Spread Sheet	$59.95	$49.00	$39.00
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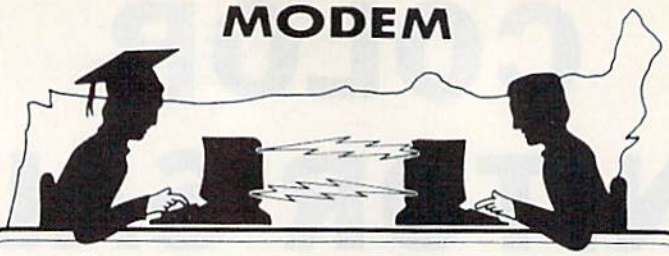

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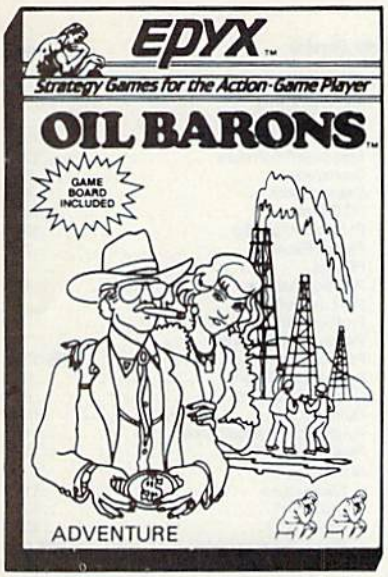

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List of Advertisers

Reader Service		Page
335	A.A. Computers	121
8	Abacus Software	69
89	Abacus Software	105
185	Abacus Software	107
39	Abby's Software	92
18	Academy Software	43
186	Adequate Software Inc.	119
*	Apropos Technology	35
*	Apropos Technology	97
243	Aries Marketing Co.	44
301	Basix Softworx	63
*	Batteries Included	13
193	Big Bytes Computers	65
82	Bill Cole Enterprises	91
156	Bytes & Pieces of WI	118
25	USI/CDI, Computer Devices Int'l	15
85	Cardco, Inc.	CIII
81	Central Point Software	105
225	Cheatsheet Products	75
109	City Software	CII
*	Comal Users Group	99
*	Commodore Business Machines	CIV
331	Computron Business Systems	91
*	Computer Centers of America	55
338	Computer Continuum	44
325	Computer Education Software	59
274	Computer Friends Inc.	119
29	Computer Warehouse	85
300	Covox, Inc.	75
44	Custom Programming Group	44, 111
*	D.A.K. Industries Inc.	41, 70, 71
318	E-Mart	103
14	Eastcoast Software	57
50	Eastern House Software	91
287	Edu-Comp	125
73	Edu-Tax	75
205	Elek-Tek	121
312	Entech	65
84	Federal Hill Software	81
320	Financial Services Marketing Corp.	34
350	Floppy House Software	58
265	Full Circle Software	115
264	Full Circle Software	65
133	Future Age Computers	125
334	Genie Software	117
144	Giga International Corp.	81
201	Glenco Engineering, Inc.	119
9	H & E Computronics	9
*	inCider Subscription	93
146	Indus Systems	79
102	Info Designs, Inc.	51
19	Inforunner	2, 3
179	Jameco Electronics	80
202	Jason-Ranheim Co.	87
*	John Henry Software	85
*	K-Soft	109
319	Kraft Systems	62
327	Kyan Software	99
*	M & M Software	127
253	MSD, Inc.	19
189	Megasoft Ltd.	46, 47
172	Micro WDI, Inc.	85, 99, 103
177	Micro World Electronix	103
212	Micro-Sys	76
169	Microcomscribe	87
68	Microprose Software	27
155	Microsphere	24, 25
27	Microtechnic Solutions	120
72	Microtechnic Solutions	59
218	Milo Software	111
43	Mimic Systems	31
345	Nibble Notch Computer Products	125
*	Omegasoft Software	125
60	Omnitronix	87
195	Orange Micro	45
171	PC Gallery	89
235	Pacific Exchanges	105
208	Parsec Research	23
221	Playnet	7
41	Prentice-Hall, Inc.	17
*	Pro-Line Software	1
74	Prof Jones/Frogg House	125
93	Professional Software	11
15	Protecto Enterprizes	128-135
23	Public Domain, Inc.	99
183	Quantum Software	68
220	Quinsept Inc.	109
219	RJ Brachman Associates	117
188	Radix Marketing	37
	RUN Magazine	
	Back Issues	119
	Dealer Sell	107
	Mailing List	107
	ReRun Subscriptions	94, 96
	Subscriptions	64
	Toll Free Number	107
	Universal Micros	125
128	Satellite Technology	105
*	Schnedler Systems	109
80	Scott Foresman & Company	98
90	Skyles Electric Works	49
304	SMADA	121
48	Software Design	111
254	Software Discounters of America	121
92	Star Micronics, Inc.	38, 39
63	Starpoint Software	33
40	Sublogic Corp.	21
24	Suncom, Inc.	22
*	Tailored Solutions	81
209	Tussey Mountain Software	109
*	Ultrabyte Inc.	95
35	Universal Software	117
332	Vision Information Products	105
96	Xetec, Inc.	59

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- **Teacher's Pet**—This educational program generates worksheets that parents and teachers can use to help youngsters learn basic arithmetic.

- **Easy Assembly**—*RUN* introduces an easy-to-follow tutorial series on programming in assembly language. If you know Basic, you'll find programming in assembly language a lot easier than you imagined.

- **Spotlight on Productivity**—This series on built-in software for the Plus/4 continues with a look at File Manager, a database program that lets you create data files, which you can merge with the Plus/4's other built-in programs.

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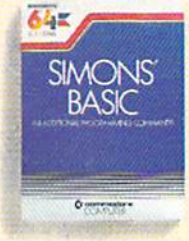

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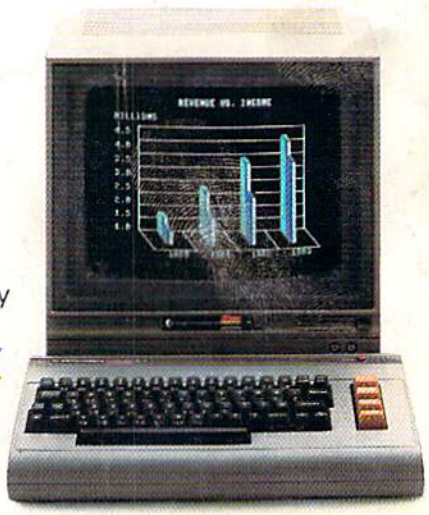
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